SERVICE MANUAL

Smokaroma, INC.

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MODELS
BB, BC, BCD

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Part No. Z222

Description of Models

This service manual is written for models BB, BC, and BCD series. There are two models for each series. For example, in the BB series, there are models BB71 and BB73. The only difference between the two is the phase. On all models, the model designated "71" is a single phase unit and the model designated "73" is a 3 phase unit.

All models can be changed in the field to either 208 VAC or 240 VAC. If the voltage is not specified when ordered, the unit will be wired for 208 VAC at the factory. It may be changed to 240 VAC by disconnecting the top element. A single phase unit may be changed to 3 phase with a change of cord and relay. This may be ordered as a modification kit (see page 24).

The BB unit is the smallest model. It is easily identifiable as having only four (4) clamp down knobs on top. It has an inside pot diameter of 13 5/8". The BC is an intermediate size pot and has six (6) clamp down knobs on top. It has an inside pot diameter of 14 5/8" I.D. The BCD is the largest size. The BCD model is basically a double BC or two BC units put together in a single cabinet. Although there is a single power source on the BCD model, the controls mounted behind the pressure pot operate that particular pot. This means that each set of controls for each pot operates independently of each other. This gives flexibility in loading and timing. It also means you won't be out of the barbecue business if one side happens to malfunction. The other side still should work independently of that side.

As far as service and repairs are concerned, all the models have the same circuitry, and operate the same. Therefore, the service will be substantially the same on all three models. The only difference in the models are size and wattage. These difference will be pointed out in the service manual.

BB

BC

BCD

Description of Operation

The Smokaroma barbequer combines the modern scientific method of pressure baking with pressure smoking to get that "old-fashion" hickory smoke flavor. It does this economically, automatically, and in a fraction of the time to prepare barbeque by ordinary methods.

In operation as a barbequer, a small amount of hickory is placed in the smoke generator cup. Meats or foods to be cooked are prepared according to the recipes and then either placed in racks which stack one on top of the other, food basket, or hung from spits on the meat rack. The capacity of each rack or food basket shelf is approximately 5 lbs. of meat. The meat rack spits will accommodate approximately 30 to 45 lbs. of meat. After the cooker is loaded with the desired amounts of food to be cooked, the lid is placed thereon such that the two "L" shaped slots are aligned with their respective clamp bolts and knobs. The two knobs are rotated upward in the slots to the upright position. Then the lid is rotated clockwise until it stops. The remaining clamp bolts (2 on the BB and 4 on the BC and BCD) may then be rotated upward in the slots and tightened. Tighten opposite knobs at the same time until all are snug.

Before heat is applied, the ejector or pressure relief valve should be placed in the closed (horizontal) position. The drain valve should also be closed. It is not necessary or desirable to release the air within the cooker.

The heat is applied when the timer is set. This causes the unit to build pressure. The wood then chars and creates smoke, which being under pressure, is forced all through the food.

The initial pressure begins at 0 psi and builds to 15 psi. Then the pressure may vary between 10 psi and 15 psi as heat is automatically applied and removed. The pressure and temperature are automatically regulated. A pressure solenoid valve will release a small amount of steam should the pressure start to build over 15 psi.

The ejector or pressure relief valve is open when the stem is erected in a vertical position and closed when it is in a horizontal position. There is a safety pressure relief valve which will release the pressure if it exceeds 16 to 17 psi.

At the end of the cooking cycle, the pressure will be automatically released. When the pressure gauge indicates zero pressure, the ejector valve should be placed in the vertical (open) position to insure complete exhaust. The cooker may be opened and the cooked food may then be removed.

Smokaroma Preventive Maintenance Suggestions

DAILY

1. At the end of each day, completely clean interior of the Bar-B-Q Boss. Do not fill with water above bottom of smoke generator. You only need to pour 1 quart of water on the bottom. Add detergent (such as "Dawn" soap). Scour good with a Scotch Brite maroon pad. Drain water and dry thoroughly. It is not necessary to scour all the smoke stain off the cooker. It is only necessary to scour grease and burnt crust of food off the walls, bottom and underside of top.
2. Clean meat rack or food basket in sink.
3. Wipe underside of lid, O-ring, and cooker pot ring with a damp dish cloth to clean of dirt and debris.

WEEKLY

1. After cleaning machine, squeeze soap solution through top port hole until it runs out port hole in cooker.
2. Flush cooker exhaust system by placing 2 quarts of water into cooker. (Add 1/4 cup soap solution. "Dawn" is excellent.) Run up to pressure and allow cooker to "pop off" for 25 minutes.
3. Turn off cooker and exhaust pressure. Remove water and dry cooker.
4. Lubricate knobs and bolt threads, underside of knobs, and top of lid where knobs turn.

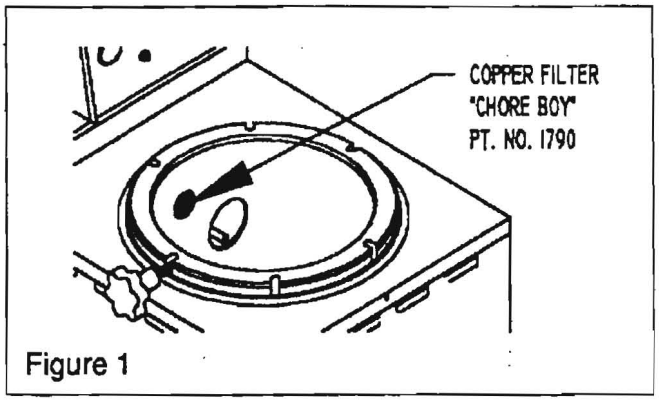


Figure 1

There is a copper "Chore Boy" filter located inside the exhaust port. The exhaust port is located on the left inside of the cooker, just to the left of the charring element housing, if looking from the front of the machine. The purpose of this filter is to prevent food particles from entering your exhaust system and clogging the lines. You should not operate the machine without the filter in place. Change the filter according to No. 9 of "Monthly Maintenance Suggestions".

"CLEANLINESS IS 90% OF MAINTENANCE"

MONTHLY

1. Observe pressure cut off point. Green light should "cut off" at 12 psi. If not, see service manual (page 22) for adjustment.
2. Observe pressure exhaust point. Exhaust should occur at between 14 to 15 psi. If not, see service manual (page 22) for adjustment.
3. Observe timer cut off point. Dial should point to "Zero" at cut off point. If not, remove dial knob and adjust.
4. Observe gauge to see if it remains in calibration, especially after abuse (for example, see if the gauge leaks, or if the dial is bent, etc.). If not in calibration, replace the gauge.
5. Tighten any loose nuts, bolts, or screws.
6. If ejector valve leaks, replace it.
7. Do not tamper with safety valve. If it leaks, replace it.
8. Examine units for any broken, missing, or deteriorated parts. Replace immediately; do not operate in a defective condition.
9. Change "Chore Boy" filter at least once per month and more often with heavy usage.

Controls & Functions

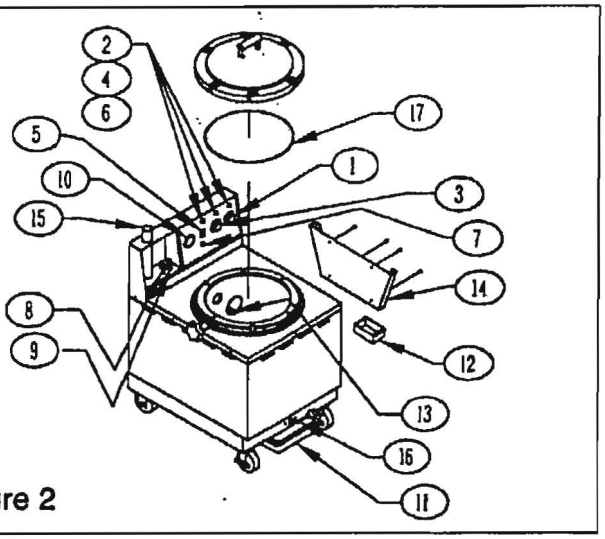


Figure 2

1. Timer Switch
Provides timed on-off main switch. All lights should come on when first turned on if thermostat is in "Bar B-Q" position.

2. Red Neon Indicator Light (Power)
Indicates timer switch is on and power is being applied to machine.

3. Thermostat
Provides automatic "Hold" control. Provides overheat prevention control. When set at "Bar B-Q" position, thermostat will cut out at a bottom temperature of 550° F. When this happens, both the temperature neon light (amber) and the green neon light will go off, or if in "Cold Smoke" mode the amber and white light will go off. When the temperature drops below 550° F, the thermostat will automatically cut back on.

4. Amber Neon Indicator Light (Temperature)
Indicated voltage is being applied through thermostat to heating elements.

5. "Cold Smoke" Switch
Provides "Cold Smoke"— "Hot Smoke" mode. In the "Off" or down position, the unit is in the "Cold Smoke" mode; only the Charring Element will heat. The white neon light will come on (with amber and red) when the timer is set to "On" and the thermostat is set to Bar-B-Q.

In the "On" or up position, the unit is in the "Hot Smoke" mode. The main elements will provide heat along with the Charring Element. The green neon light will be on (with amber and red) when the timer is set to "On" and the thermostat is set to Bar-B-Q. However, the green light will cycle off when approximately 12 psi is reached and on when pressure drops below 10 psi.

6. Green Neon Indicator Light (Pressure)
Indicates voltage is applied through pressure switch to heating elements. Should go out at 12 psi. Green light will not light in "Cold Smoke" mode.

7. White Neon Indicator Light (Cold Smoke)
Indicates when "Cold Smoke" switch is in the "Cold Smoke" mode.

8. Ejector Valve
Provides manual valve for closing to build pressure and opening to relieve pressure.

9. Safety Valve
Provides valve for relieving pressure should it exceed 17 psi. Resets at 15 psi.

10. Pressure Gauge
Indicates pressure (psi). After initial pressure is built up, it normally operates between 12 and 15 psi (indicated by green area).

11. Drain Pan
Use in cleaning cooker. It is located beneath the cooker directly beneath the drain valve. Pan catches drippings out of cooker pot when opening drain valve.

12. Charring Cup
Container which holds wood for charring during the smoking process.

13. Charring Element
Provides heat source of 230 watts at 240 volts for charring wood.

14. Lid Rack
Used to hold the top lid when not in use. It is located on side of cooker cabinet.

15. Muffler
Designed to condense some moisture being released from the machine and prevent splattering on the wall.

16. Drain Valve and Handle
Provides for cleaning when opened. Should be closed during the cooking operation. Valve is opened when handle is rotated counterclockwise to the down or vertical position.

17. O-Ring
Provides pressure seal when lid is clamped in place.

Controls & Functions

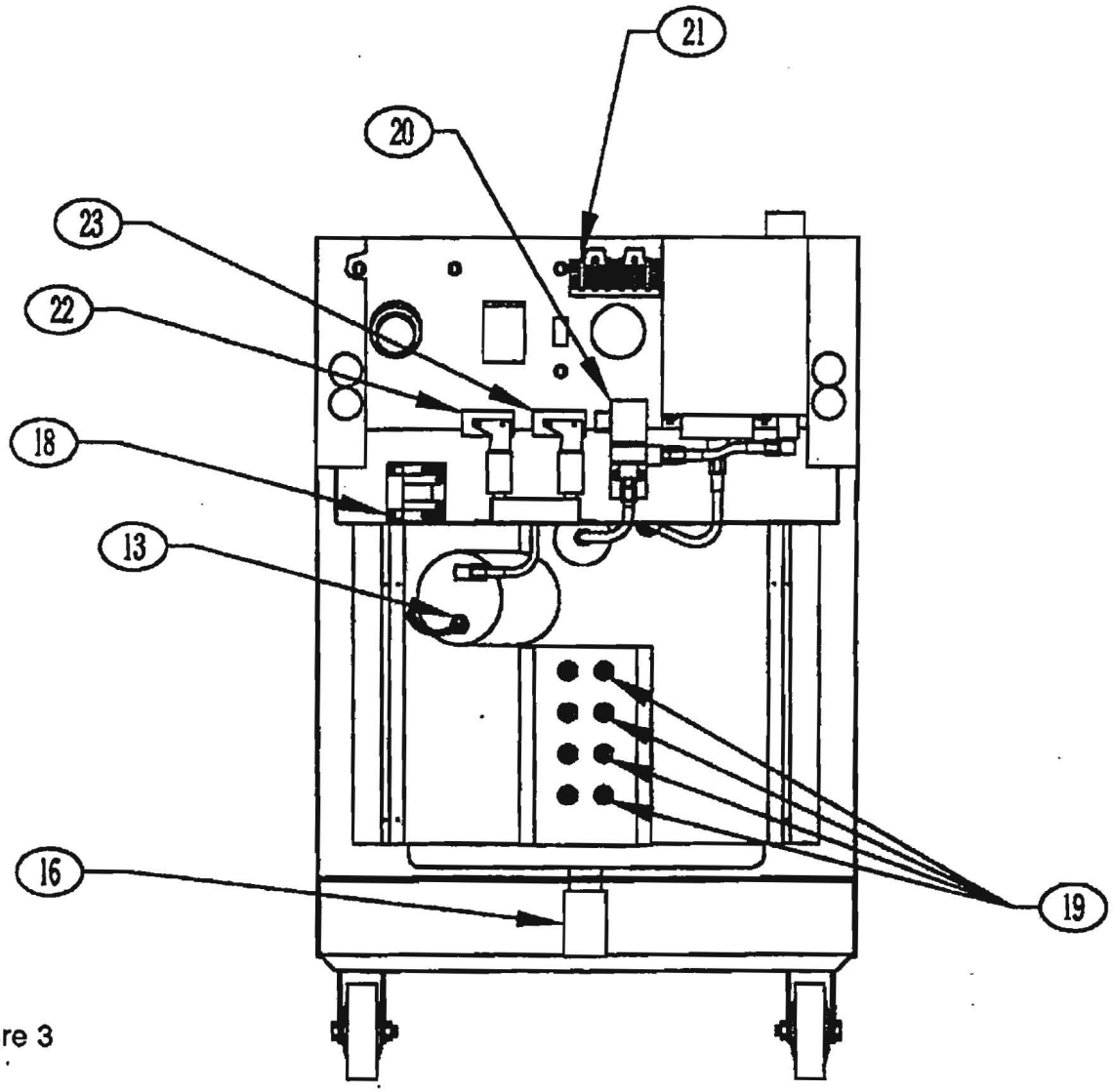


Figure 3

18. Power Relay
Provides power to the main elements when energized by control circuit. The control circuit consists of timer switch, thermostat and Pressure Switch No. 1, all in series with power relay coil.

19. Main Elements
Provides main source of heat. Each element is rated at 1540 watts @ 240V for the BB and 1650 watts @ 240V for the BC and BCD. Four (4) elements are used @ 208V. The extra element at the lower voltage (208V) produces about the same wattage as three (3) elements at the higher voltage (240V). Three (3) elements are used @ 240V.

20. Exhaust Solenoid
Provides valve to exhaust steam automatically at end of cooking cycle and to control pressure at below 15 psi by exhausting intermittently during cooking cycle. The exhaust solenoid is controlled by the Timer Switch and Pressure Switch No. 2.

21. Terminal Strip (TB-1 thru 5)
Provides junction for connecting wires.

22. Low Side (Left) Pressure Switch (No. 1)
Opens control circuit at 12 psi to de-energize Power Relay thereby removing heat. Closes at 11 psi on pressure drop to energize power relay thereby adding heat.

23. High Side (Right) Pressure Switch (No. 2)
Opens solenoid at approximately 14 1/2 psi to control pressure at below 15 psi. Closes at approximately 13 1/2 psi on pressure drop.

Quick Check for Functions & Controls

The following is a method of performing quick checks on the Bar-B-Q Boss to see if it is functioning correctly. It mainly consists of visual checks and checks by touch. It is divided into three parts: "Function checks for Indicator Lights . . .", "Function checks for Power Relay . . .", and "Function checks for leaks. . ." Be sure all checks are made before going to another part.

1. Function checks for Indicator Lights, Time Switch , Thermostat, Pressure Switch and Solenoid.

A. Action:

1. Plug machine into outlet of proper voltage. (See nameplate).
2. Turn thermostat knob to the "Bar-B-Q" position.
3. Rotate timer switch to 1 hour and slowly back to the "0" position.

B. Checks – The following should happen: All indicator lights (except cold smoke light when cold smoke switch is in the up position) should light and then go off when the pointer on the time switch reaches "0" time.

C. Possible Troubles – If these things do not happen, it may indicate one or more of the following troubles:

SYMPTOMS	POSSIBLE TROUBLES	TO REPAIR SEE:
a. No indicator lights come on.	1. Assuming correct voltage is available at the outlet, defective wiring in power cord.	"I. Won't Heat, B, Detailed Trouble Shooting Chart", page 8 and "Wiring Diagram", pages 31, 32, and 33.
	2. Defective wiring in control box.	"I. Won't Heat, C, Detailed Trouble Shooting Chart", page 8 and "Wiring Diagram", pages 31, 32 and 33.
	3. Defective timer switch	"I. Won't Heat, D, Detailed Trouble Shooting Chart", page 8 and "How Replace Timer Switch", page 20.
	4. Defective lights.	Exploded Parts Sheet, page 30.
b. Power light comes on but Amber (Temperature) and Green (Pressue) lights do not come on.	1. Defective wiring.	Wiring diagram pages 31, 32, and 33.
	2. Defective thermostat.	"I. Won't Heat, E, Detailed Trouble Shooting Chart", page 8.
	3. Defective lights	Exploded Parts Sheet, page 30.
	4. Thermostat must be turned to Bar-B-Q position.	

Quick Check for Functions & Controls

c. Power and temperature lights (Red and Amber) comes on but Green pressure) light does not come on.	1. Defective wiring.	Wiring diagram. pages 31, 32 and 33.
	2. Defective Pressure Switch.	"I. Won't Heat Detailed Trouble Shooting Chart", page 8.
	3. Defective Lights.	Exploded Parts Sheet, page 30.
	4. Defective Cold Smoke Switch.	

D. Action – Press "Cold Smoke" down to Cold Smoke position. Repeat above A, B, and C.

E. Assuming that all controls function correctly when checked above, a further check should be made as follows:

II. Function checks for Power Relay, Charring Element, and Main Elements:

A. Actions and Checks: Caution: These checks should only be done when cooker is cold or from a cold start.

1. Rotate thermostat to the "BAR-B-Q" position and then rotate timer switch to "2" hours on the dial. All lights should light and solenoid should energize.
2. Immediately remove top and briefly touch the charring rod. It should start to get hot to the touch in a very short time.
3. Put hands on lower side of cooker to see if it becomes warm when the cooker is cold, it may take several minutes before the side becomes warm to the touch.

B. Possible Trouble – If these things do not happen it may indicate one or more of the following problems.

SYMPTOMS	POSSIBLE TROUBLES	TO REPAIR SEE:
e. Charring Element does not become warm.	1. Defective wiring.	For all troubles listed here, see "IV. Won't Create Smoke, Detailed Trouble Shooting Chart", page 13.
	2. Defective Thermostat.	
	3. Defective Charring Element	
f. Side of cooker does not warm.	1. Defective wiring.	For all troubles listed here, see "I. Won't Heat, Detailed Trouble Shooting Chart", page 8.
	2. Defective Power Relay.	
	3. Defective Main Elements.	(Note: This unit has four separate elements. Therefore it's rare that all elements will burn out at once unless an over voltage has been applied. Most likely the wires from the power relay are defective.
	4. Cold Smoke Switch must be in "UP" position and green light is "on".	

F. Assuming that all controls or parts are functioning correctly to this point, make the following test:

III. Pressure checks for leaks, check for solenoid functioning, calibration checks for pressure switch and time switch and addition check for main element.

A. Action:

1. Remove the meat rack assembly or food basket, and charring cup.
2. Put 1 quart of water on the bottom.
3. Rotate thermostat to the "Bar-B-Q" position and then rotate time switch dial to "2" hours. (Note time on your watch when time switch was set to "2" hours.)
4. Place top on and clamp down with ejector valve in the closed position.

B. Checks – When this is done the following should happen:

1. Pressure should build.
2. The timer switch should move one mark clockwise after 5 minutes.
3. The green light (Pressure) should go out when the pointer of gauge is at 12 psi when pres sure is rising.
4. The solenoid should exhaust when the pointer of the gauge is between 14 and 15 psi when pressure is rising.

C. Possible Troubles – If these things do not happen, it may indicate one or more of the following problems:

SYMPTOMS	POSSIBLE TROUBLES	TO REPAIR SEE:
a. Pressure does not start to rise at all after 15 minutes.	1. Leak	"III. Heats But Won't Build Pressure, Detailed Trouble Shooting Chart", page 12.
	2. Defective Gauge	
	3. Defective Ejector, release, or safety valve	
	4. Defective Drain Valve	
b. Pressure starts to rise but does not get over 5 psi.	1. See A1, A2, and A3 above.	"II. D. Heats Only Warm, Detailed Trouble Shooting Chart", page 11.
	2. One or more Main Elements is defective.	
c. Green light will not go out at 12 psi.	1. Pressure setting is too high	"How to Adjust Pressure Switch", page 22.
d. Pressure will not release at 141/2 psi.	1. Pressure Switch setting is too high or low.	"How to Adjust Pressure Switch", page 22.
	2. Defective solenoid	
	3. Pressure line stopped up.	"VII. Won't Exhaust, Detailed Trouble Shooting Chart", page 16.

Detailed Trouble Shooting Chart

FOREWORD TO THE "DETAILED TROUBLE SHOOTING CHART LIST"

The Detailed Trouble Shooting Chart list the "Trouble", what to "Check or Adjust" and what further you need to do to fix it under "For Information See". We tried to list the "Trouble" just as the customer would experience or say it. The most prevalent trouble, "Won't Heat" is listed first. To repair, find the description which is mostly closely associated with the problem and proceed step by step down the "Check or Adjust" list. When the problem is isolated to a part, see the reference listed under "For Further Information See". If this solves the problem, you may then test the unit according to the "Quick Check" to make sure everything is functioning correctly. If it is, congratulations, if it is not, proceed to the next step.

Generally the procedure is written for low voltage (208 to 240V AC) and single phase. Since all control circuits (208 to 240V AC, single phase) are the same regardless of the voltage or phase, the trouble shooting will be the same for it. Where the procedure differs it will be marked clearly with a phrase **"For 3-Phase"**.

Detailed Trouble Shooting Chart

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
1. WON'T HEAT	**A. VOLTAGE** – (Thermostat should be rotated to the "BAR-B-Q" position). Voltage at outlet should be same as voltage specified on name plate ± 5%. If not, have electrician to correct.	Name plate on back of of cover of Bar-B-Q Boss.
	B. Make sure unit is disconnected from outlet. Remove back cover, check all wire connections for loose or burnt connections. Plug into outlet and measure voltage across terminal R-1 and R-2 of power relay. Voltage should be the same as that specified on name plate ± 5%. If not, check handle cap (plug) to see if it is wired right. (Green is ground.) **For 3 phase:** Check voltages across terminals R-1 and R-2, across R-1 and R-3, and across R-2 and R-3. Voltage should be the same as that specified by the name plate ± 5%.	"How to Remove Back Panel", page 20 and "Wiring Diagram" on pages 30, 31, and 32.
	C. Check voltage R-1 and TB-5. It should show 208 to 240 VAC ± 5%. If not, replace white wire from R-2 to TB-5.	"Wiring Diagram" on pages 30, 31, and 32.
	D. TIMER SWITCH – Check time switch as follows: 1. Turn timer switch to "1" hour position.	
	2. Connect voltmeter across TB-1 and TB-5 on terminal strip. Voltmeter should read 208 to 240 VAC ± 5%. If it does, proceed to "E".	"Wiring Diagram" on pages 30, 31, and 32.
	3. If it does not, check wiring up to this point by removing black wire to timer switch, from the timer switch terminal. Connect voltmeter across the end of the black wire and at relay R-2 terminal. Voltmeter should read 208 to 240 VAC ± 5%. If it does not, replace black wire.	"Wiring Diagram" on pages 30, 31, and 32.

4. Turn timer switch to the "On" position and measure the voltage from the timer switch terminal where the orange wire is connected and TB-5. The voltmeter should read 208 to 240 VAC ± 5%. If it does not, replace the timer switch. If it does, connect voltmeter across TB-1and TB-5 on terminal strip. Voltmeter should read 208 to 240 V AC ± 5%. If it does not, replace orange wire. If it does, proceed to "E" below.

"How to Replace Timer Switch", on page 20.

E. THERMOSTAT – The thermostat should be in the "BAR-B-Q" position. Check the voltage between TB-2 and TB-5. The meter should show 208 to 240 VAC ± 5%. If it does not, check the voltage between the thermostat terminal where the purple wire connects and TB-5. Voltmeter should read 208 to 240 VAC ± 5%. If it does not, replace the purple wire. If 208 to 240 VAC ± 5% appears, then check and see if it appears between the thermostat terminal on which the black and white striped wire is connected and TB-5. If it does not, replace the thermostat. If 208 to 240 VAC ± 5% appears, then proceed to "F".

"How to Replace Thermostat", page 21. See "Wiring Diagram", pages 30, 31 and 32.

F. PRESSURE SWITCH NO. 1 – Check voltage with voltmeter between Pressure Switch No. 1 terminal (left pressure switch) on which the green wire appears and TB-5. Voltmeter should read 208 to 240 VAC ± 5%. If it does not, replace the green wire. If it does, check the voltage between the Pressure Switch No. 1 terminal on which the blue wire appears and TB-5, 208 to 240 VAC ± 5% should appear. If it does not, adjust the pressure switch. If pressure will not adjust, replace pressure switch. If the voltmeter does read 208 to 240 VAC ± 5% proceed to "G" below and check.

"Wiring Diagram" on pages 30, 31 and 32.

"How to Adjust Pressure Switch", page 22.

"How to Replace Pressure Switch, page 22.

G. POWER RELAY – Check the voltage with a voltmeter between terminals R-4 and R-5 on the power relay coil. Voltmeter should read 208 to 240 VAC ± 5%. If it does, and the relay is not energized, replace the relay. If the voltmeter does not read 208 to 240 VAC ± 5% check the voltage between R-4 and TB-5. Voltmeter should read 208 to 240 VAC ± 5%. If it does not, replace the blue wire to the coil. If it does read 208 to 240 VAC ± 5%, replace the white wire from the coil to TB-5. If the relay is energized and elements do not heat, proceed to "H" and check.

"Wiring Diagram" on pages 30, 31 and 32, and How to Replace Power Relay", page 23.

H. MAIN ELEMENTS – Remove bottom control panel cover to expose the element ends. There are four (4) elements per cooking unit. Three (3) are used for 240/415 volts operation and four (4) are used for 208-220/380 volts operation. Check the voltage between R-6 and R-7 of the power relay with the relay energized. The voltmeter should read 208 to 240 VAC ± 5%.

"How to Remove Back Panel and Bottom Control Panel Cover", page 20.

Wiring Diagram, pages 30, 31 and 32.

Detailed Trouble Shooting Chart

For 3 Phase: With the relay energized, check the voltage between R-6 and R-7, between R-6 and R-8 and between R-7 and R-8. Voltage should be the same, in each case, as that specified by the name plate ± 5%.

Single Phase Cont.: Check the voltage at the element terminals where the leads are connected. The voltmeter should read 208 to 240 VAC ± 5%. If it does not, check continuity of the lead wires by connecting one (1) voltmeter lead to R-6 and one (1) voltmeter lead to the element terminal on the left side. Voltmeter should read 208 to 240 VAC ± 5%. If it does not, replace the lead wire on the left side. Reverse this process by checking the voltage between terminal R-7 on the power relay and the element terminal on the right side of the elements. The voltmeter should read line voltage ± 5%. If it does not, replace the lead on the right side.

"How to Replace Heating Element", page 29.

If the voltmeter reads line voltages across the terminal of the elements and any one does not heat, remove all connections on the elements and check the resistance with ohmmeter of each element. The resistance should read 35 ohms ± 5% for the BC and BCD and 37 ± 5% ohms for the BB. If the ohmmeter indicates differently than these values, replace the element or elements.

For 3 Phase: Check the voltage at the element terminals where each of the three leads are connected. That is, check between lead one (1) and lead two (2), lead one (1 and lead three (3), and lead two (2) and three (3). In each case, the voltmeter should read line voltage ± 5%. If it does not, check continuity of the lead wire by connecting one voltmeter lead to R-6 and any of the other two corresponding lead terminal at the element. For example, if your voltmeter lead is on R-6 then the other lead should be on the lead terminal end at the element of lead two (2). The voltmeter should read line voltage. If it does not, replace lead two (2). Repeat this process for R-7 checking the voltage at the end of lead 3 at the element terminal. Also for R-8, checking the voltage at the end of lead one (1) at the element terminal. You may also check continuity of the lead wires with an ohmmeter. Be sure the unit is unplugged and voltage is removed. Check the continuity by measuring between R-6 and the end of the lead in at the element terminal. If it does not have continuity, replace the lead. Repeat this process for R-7 and R-8.

If the voltmeter reads line voltage across the terminals of any of the elements and any one element does not heat, remove all connections on the element and check the resistance with the ohmmeter of each element. The resistance should read 35 ohms ± 5% for the BC and the BCD, and 37 ± 5% ohms for the BB. If the ohmmeter indicates differently then these values, replace the element or elements.

Detailed Trouble Shooting Chart

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
II. HEATS ONLY WARM AND PRESSURE BUILDS UP EXCEEDINGLY SLOW	**A. VOLTAGE** – Check line voltage and be sure that the voltage is same as specified on nameplate ± 5%. If it is, check and see if 208 to 240 VAC ± 5% is applied to the L1 and L2 wires in power cord. Green wire should be grounded. Sometimes with a three wire power cord, a lower voltage is applied to the cooker through error. If this is the case, correct plug or receptacle such that the correct voltage is applied, to L1 and L2 wires in power cord. **For 3 Phase:** Line voltage should appear between L1 and L2, L1 and L3. and L2 and L3.	Wiring Diagram, pages 30, 31 and 32.
	B. Check amperage with an "Amprobe" type meter by encircling one lead to main elements. It should read not less than 20 amperes (See Wiring Diagram page 30 for actual current on L1 and L2). If it reads less than 20 amperes, recheck "A" above and then proceed to "C" below. **For 3 phase:** This current reading should not be less than 5 amperes but not more than 11 ampheres. (See Wiring Diagrams, pages 31 and 32) for actual current on L1, L2, and L3.	Wiring Diagram, pages 30, 31 and 32.
	C. MAIN ELEMENTS – With the timer switch "On" and the thermostat rotated to "Bar-B-Q" position, check voltage at terminals of element. It should be the same as the 208 to 240 VAC ± 5%. If it isn't, check through "I. Won't Heat, Detailed Trouble Shooting Chart" then correct defective parts. If the 208 to 240 VAC ± 5% appears across terminals of main elements proceed to "H" "I. Won't Heat, Detailed Trouble Shooting Chart".	"How to Replace Main Element", page 29.

Detailed Trouble Shooting Chart

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
III. HEATS BUT WON'T BUILD PRESSURE	**A. GAUGE** – Check for leaks around gauge connections. If loose, tighten. Check gauge to see if pointer is unobstructed. If defective, replace gauge.	
	B. EJECTOR VALVE – When stem is down, ejector valve should be closed and pressure tight. If the ejector valve leaks, replace.	
	C. SAFETY VALVE – Safety valve should function at 17 ± 1 psi. It will then reset itself, at approximately 15 psi. If the safety tends to leak slightly, sometimes it can be stopped by slight pressure with your finger. If it continues to leak, replace.	
	D. SEAL – Check O-ring for cracks or breaks. Check O-ring and the surface where it seats on the pot ring. Both should be free of foreign matter, such as, hickory shavings, prep mix or sauce. The pot ring should also be free of nicks and scars.	
	E. PLUMBING – Check all connections and pipe fitting in panel for leaks. Check manifold connections on cooker body, and around drain valve for leaks (preferably with air pressure and using soap suds). Tighten any loose fittings. Replace drain valve if it leaks.	
	F. VOLTAGE AT SOLENOID – Check voltage across terminal with black wire on right pressure switch (No. 2) and TB-5, 208 to 240 VAC ± 5% should appear. If it does and solenoid will not close, replace solenoid. If 208 to 240 VAC ± 5% does not appear at these terminals with power on, check "A" through "D" of "I. Won't Heat, Detailed Trouble Shooting Chart". If this checks out, then, check voltage between terminal with black wire on right pressure switch (No. 2) and TB-5, 208 to 240 VAC ± 5% should appear. If not, check adjustment of right Pressure Switch (No. 2). If pressure switch will not adjust, replace pressure switch.	"How to Replace Solenoid", page 25. "How to Adjust Pressure Switch". page 22. "How to Replace Pressure Switch", page 22.

Detailed Trouble Shooting Chart

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
IV. WON'T CREATE SMOKE	**A. VOLTAGE** – With time switch set at "1" hour and thermostat at "Bar-B-Q" position, check voltage across TB-2 and TB-5. Line voltage should appear. If not, voltage should be checked as specified in "A" through "E" under "I. Won't Heat" trouble.	
	B. CHARRING ELEMENT – If 208 to 240 VAC ± 5% appears across TB-2 and TB-5, the charring element should heat. If it does not, check for loose terminals. If none are found, replace charring element. Alternate: Check the resistance of the charring element with an ohmmeter. It should read 250 ohms ± 10%. If it does not, replace the charring element.	"How to Replace Charring Element", page 21.

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
V. OVERHEATS	**A. Check for leaks.** If cooker is leaking, it cannot get up to cutoff pressure (12 psi for left pressure switch No. 1) to open solenoid and remove heat, and cooker will overheat.	
	B. LEFT PRESSURE SWITCH (1) – Pressure switch should cut off at 12 psi. If it does not, adjust pressure switch to cut off at this pressure. If pressure switch will not adjust, replace.	"How to Adjust Pressure Switch", page 22. "How to Replace Pressure Switch", page 22.
	C. RIGHT PRESSURE SWITCH (2) – Pressure switch should open solenoid at 14 1/2 psi and release pressure to approximately 13 1/2 psi. If it does not, adjust pressure to open at 14 1/2 psi. If pressure switch will not adjust, replace.	"How to Adjust Pressure Switch", page 22. "How to Replace Pressure Switch", page 22.
	D. THERMOSTAT – The thermostat is designed to prevent overheating, and possible damage to unit. It is designed to cut off at a temperature of 550° F at point on which the thermostat bulb is mounted. Rotate thermostat knob slowly toward "off". Thermostat should click off somewhere between "hold" and "off" position at approximately the 2:00 o'clock position.	"How to Replace Thermostat", page 21.

Detailed Trouble Shooting Chart

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
	E. MAIN ELEMENTS – Check element connection configuration to see if they are wired for the right voltage. (See bottom of wiring diagram.) For low voltage (208 to 220/380 volts) operation, four (4) elements are used. For high voltage operation (240/415 volts), three (3) elements are used. If four (4) elements are used on high voltage operation, the unit will overheat. Rewire connections, if incorrect. **For Single Phase:** Elements are connected in parallel. **For 3 Phase:** Elements are connected either in a "Delta" or "Wye" configuration.	Rewire Connections "Wiring Diagram", pages 31, 32 and 33.
	F. POWER RELAY – Power relay should be normally open when no voltage is applied. You should be able to move the contactor from the normally closed position with your fingers **(make sure power is removed before trying this).** If the contacts are welded in the normally closed position, relay should be replaced. If contact points are badly pitted, replace power relay.	"How to Replace Power Relay", page 23.

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
VI. PRESSURE BUILDS UP HIGH	**A. CHECKING PRESSURE LINES AND CONNECTORS** 1. Check large exhaust port hole, and adapter located inside cooker above and to the left of the charring element cavity. Remove back panel. Be sure hose and adapter are not stopped up by disconnecting hose from solenoid and blowing through hose. If there is any obstruction, replace hose and/or adapter. 2. Remove Muffler and blow through it to be sure it is not stopped up. Clean to remove any obstruction. 3. Check pressure switch port hole located on back	

Detailed Trouble Shooting Chart

	of charring element housing. Be sure it is not stopped up by disconnecting hose from pressure switches manifold and blowing through hose. If there is any obstruction, replace hose and/or adapter.	
	B. LEFT PRESSURE SWITCH (1) – Observe pressure indicated on gauge at which pressure indicator light (green) cuts off. This point should be at 12 psi. If not, adjust pressure switch to open at this point. If pressure switch will not adjust, replace.	"How to Adjust Pressure Switch", page 22. "How to Replace Pressure Switch", page 22.
	C. RIGHT PRESSURE SWITCH (2) – Pressure switch should open solenoid at 14 1/2 psi and release pressure to approximately 13 1/2 psi. If it does not, adjust pressure switch to open at 14 1/2 psi. If pressure switch will not adjust, replace.	"How to Adjust Pressure Switch", page 22. "How to Replace Pressure Switch", page 22.
	D. POWER RELAY – Power Relay should be normally open when no voltage is applied. You should be able to move the contactor from the normally closed position with your fingers **(make sure power cord is removed before trying this)**. If the contacts are welded in the normally closed position, replace relay. If contact points are badly pitted, replace power relay.	"How to Replace Power Relay", page 23.

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
VII. PRESSURE CUT OFF POINT VARIES OR CHANGES AFTER ADJUSTING	**A.** Tighten Micro-Switch attachment screws on each pressure switch.	
	B. LEFT PRESSURE SWITCH (1) – Observe pressure indicated on gauge at which green indicator light cuts off. This point should be at 12 psi. If not, adjust pressure switch open at this point. If pressure switch will not adjust, replace.	"How to Adjust Pressure Switch", page 22. "How to Replace Pressure Switch", page 22.

Detailed Trouble Shooting Chart

C. RIGHT PRESSURE SWITCH (2) – Pressure switch should open solenoid at 14 1/2 psi and release pressure to aproximately 13 1/2 psi. If it does not, adjust pressure to open at 14 1/2 psi. If pressure switch will not adjust, replace.

"How to Adjust Pressure Switch", page 22. "How to Replace Pressure Switch", page 22.

D. CHECKING PRESSURE LINES AND CONNECTORS

1. Check large exhaust port hole, and adapter located inside cooker above and to the left of the charring element cavitiy. Remove back panel. Be sure hose and adapter are not stopped up by disconnecting hose from solenoid and blowing through hose. If there is any obstruction, replace hose and/or adapter.

2. Remove Muffler and blow through it to be sure it is not stopped up. Clean to remove any obstruction.

3. Check pressure switch port hole located on back of charring element housing. Be sure it is not stopped up by disconnecting hose from pressure switches manifold and blowing through hose. If there is any obstruction, replace hose and/or adapter.

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
VIII. WON'T EXHAUST	**A.** Remove muffler and blow through it to be sure it is not stopped up. Clean it to remove any obstruction.	"How to Repair Solenoid Valve", page 26 or "How to Replace Solenoid", page 25.
	B. EXHAUST HOSE – Disconnect exhaust hose from solenoid valve to muffler. Blow through it to be sure that it is not obstructed. If it is, remove obstruction or replace hose.	
	C. Remove hose from solenoid bottom. Blow through solenoid to be sure it is not obstructed. It it is, remove obstruction or replace solenoid.	
	D. Check large exhaust port hole and adapter located inside cooker above and to the left of the charring element cavity. If it is obstructed, remove obstruction or replace hose and/or adapter.	

Detailed Trouble Shooting Chart

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
IX. PRESSURE BLEED OFF TOO SLOW AT end of cooking cycle. (This happens either or during cooking cycle, when Solenoid opens to relieve excess pressure. Sometimes green light will also come on.	**A.** Blow though solenoid to be sure it is not obstructed, if it is, repair or replace solenoid valve. **B.** Disconnect exhaust hose from bottom of solenoid exhaust valve. Blow through it to be sure it is not obstructed. If it is, remove obstruction or replace hose. **C.** Disconnect solenoid exhaust hose from side of solenoid to muffler. Blow through it to be sure it is not obstructed. If it is, remove obstruction or replace. **D.** Check large exhaust port hole and adapter located inside cooker above and to the left of the charring element. If it is obstructed, remove obstruction or replace hose and/or adapter.	"How to Repair Solenoid Valve, page 25 or "How to Replace Solenoid", page 26.

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
X. TIMER SWITCH POINTER WON'T MOVE	**A.** Plug power cord into outlet with correct voltage. Rotate timer switch through "ON" position and all the way around clockwise slowly to the "Zero" time position. If timer switch is working correctly red (power) indicator light will light and then go off at the "ZERO" time division. If red light does not come on, then proceed to "C" and check. **B. If red light comes on and timer switch is in calibration,** turn timer switch pointer to "2" hour position and time with watch. Timer switch pointer should move one mark clockwise in 5 minutes. If pointer does not move, check to see if timer switch motor leads are connected to TB-1 and TB-5. If they are and pointer does not move, proceed to "C". **C.** Check timer switch as follows: 1. Turn timer switch to "1" hour position.	

Detailed Trouble Shooting Chart

	2. Connect voltmeter across TB-1 and TB-5 on terminal strip. Voltmeter should read 208 to 240 VAC ± 5%. If it does replace timer switch.	"How to Replace Timer Switch", page 20.
	3. If it does not, check wiring up to this point by removing black wire to time switch, from the time switch terminal. Connect one lead of voltmeter to the end of the black wire and the other lead to relay R-2 terminal. Voltmeter should read 208 to 240 VAC ± 5%. If it does not, replace wire. If the voltmeter does read 208 to 240 VAC ± 5% at the end of the terminal, put the wire back on timer switch terminal.	
	4. Turn timer switch to the "On" position and measure the voltage from the timer switch terminal where the orange wire is connected to and where the other end is connected to TB-5. The voltmeter should read 208 to 240 VAC ± 5%. If it does not, replace the time switch. If it does, replace the orange wire and repeat "B" above.	"How to Replace Timer Switch", page 20.

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
XI. CHATTERING NOISE IN BACK WHEN TIMER IS TURNED ON.	**Note:** Generally this condition describes a low voltage or incorrect voltage application. The most common which occurs is the application of 120V on a 240V line. The resulting noise is caused by the relay and solenoid trying to "pull in" but can't because of insufficient voltage (both have 208 to 240V coils). This problem is generally caused by the plug or receptacle being wired incorrectly.	"How to Replace Charring Element", page 21.
	A. **VOLTAGE** – Check line voltage and be sure that it is same voltage as that specified on name plate ± 5%. If it is, check and see if line voltage is applied to the L1 nd L2 wires in power cord. Green wire should be grounded. Sometimes on a three wire system, one half voltage (110 to 120 volts) is applied to the cooker through error. If this is the case, correct plug or receptacle such	

Detailed Trouble Shooting Chart

	that correct voltage is applied, to black and white wires in power cord.	
	B. Check amperage with an "Amprobe" type meter by encircling one lead to the main element. It should read no less than 20 amperes. If it reads less than 20 amperes, check "A" above. (See wiring diagram for actual current on L1 and L2). **For 3 Phase:** This current reading will be less than 5 amperes but not more than 11 amperes (See wiring diagram for actual current on L1, L2, and L3.	Wiring Diagram, pages 30, 31 and 32.

TROUBLE	CHECK OR ADJUST	FOR FURTHER INFORMATION SEE:
XII. TIMER SWITCH "OFF"BUT INDICATOR LIGHTS ON DIM AND RELAY AND SOLENOID CHATTER.	**Note:** Generally this contion describes a charring element shorted to the ground. In this case, the charring element may or may not heat. However, it allows a voltage (maximum of 120 volts) to be applied across the lights, power relay and solenoid from the other side of 240 volts (even though the timer is off). The low voltage is sufficient to alow them to light dimly and to chatter, but it is not enough to fully activate them. **A. VOLTAGE** – With timer switch in the "On" position, check voltage from TB-3 to TB-4. It should read 208 to 240 VAC ± 5%. B. With timer switch in the "Off" position, check voltage from TB-3 to TB-4, if voltage reads up to 120 volts, replace charring element. You may also check the charring element for ground with an ohmmeter. To do this, remove both charring element leads from TB-3 and TB-4. Touch one lead to one of the Ohmmeter leads and the other Ohmmeter lead to the cooker cabinet. Then touch the other lead to one end of the Ohmmeter and the other lead to the Ohmmeter to the cooker cabinet. If either read zero ohms, replace charring element.	"How to Replace Charring Element", page 21.

HOW TO REMOVE BACK PANELS

See Figure 5

To remove back panel:

1. Caution: Always remove plug from power outlet before removing back panel.
2. Remove six 10-24 screws from back panel.

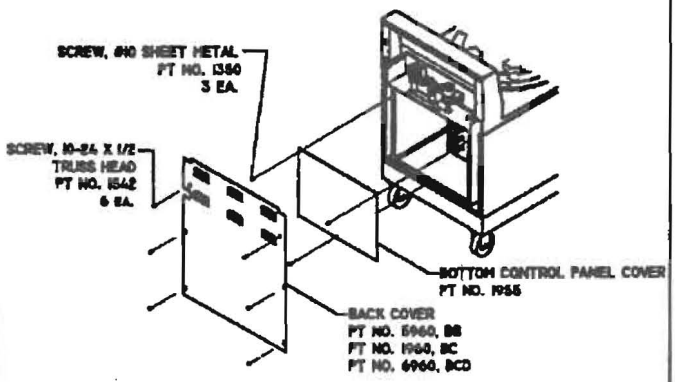


Figure 5

Removing the bottom control panel cover.

If it is necessary to check the heating elements, change the heating elements, or change the wiring for different line voltage for the machine to operate on, you must remove the bottom control panel cover. This panel may be seen after removing the back cover.

1. Caution: Always remove plug from power outlet before removing back panel or bottom control panel cover.
2. To remove the bottom control panel cover, simply remove the three (3) No. 10 Pan Head Sheet Metal Screws. Then the panel may be removed.

HOW TO REPLACE TIMER SWITCH

Pt. No. 1008 - 50HZ
Pt. No. 1012 - 60 HZ
See Figure 6

To remove the timer switch:

1. Remove timer switch knob by pulling if off shaft from the front.
2. Remove back panel as outlined in "How to Remove Back Panel".
3. Unscrew two 4-40 screws from the front holding the timer switch to the face plate.
4. Remove timer switch and disconnect black and orange wires from terminals on the timer switch.
5. Remove brown wires from timer motor on timer switch from terminal strip on TB-1 and TB-5.
6. Remove timer switch from back control box.

To install new timer switch:

1. Reconnect brown wires from timer motor to TB-1 and TB-5 on terminal block.
2. Replace black wire to top spade terminal on timer switch and orange on bottom spade terminal on timer switch.
3. Push timer switch through the back of the face plate such that the shaft goes through the hole in the face plate.
4. Secure timer switch with two 4-40 screws to the face plate.
5. Place on timer switch knob. Be sure that pointer marker on knob matches with zero, when timer switch is in the "Off" position. If it does not, adjust by removing timer switch knob. Loosen two 4-40 screws. Turn timer switch clockwise or counterclockwise to align pointer with zero mark on face plate.
6. Check timer switch by plugging in power cord into power receptacle. Then turn timer switch to "2" hour position and see if red light comes on. Time "timer switch" with a watch for 5 minutes and see if pointer moves one mark counterclockwise in 5 minutes.
7. If it does, replace back panel.

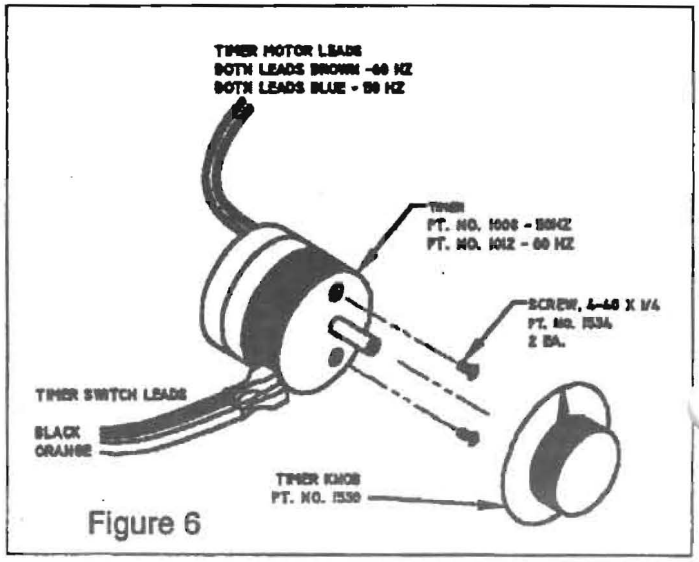


Figure 6

HOW TO REPLACE THERMOSTAT

Pt No. 1002
See Figure 7

To remove old thermostat:

1. Remove front knob by pulling off shaft.
2. Remove two 6-32 screws attaching thermostat to front panel.
3. Remove back panel from console as outlined on this page, "How To Remove Back Panel" on page 20.
4. Remove two wires from the thermostat terminal. Lean cooker forward until top front rests on floor.
5. Remove red skirt cover.
6. Loosen 10-24 screw holding thermostat bulb clamp.
7. Remove thermostat bulb.
8. Remove thermostat.

To install new thermostat:

1. Replace old thermostat with new thermostat. Thread bulb and capillary tube back through hole in control box in back of cooker and place bulb in the clamp on the bottom of cooker.
2. Tighten screw and clamp bulb in place.
3. Replace red skirt cover with four 10-24 screws.
4. Turn cooker right side up.
5. Replace wires on thermostat terminal as per figure 7.
6. Attach thermostat to front panel with two 6-3 screws.
7. Place thermostat knob on thermostat. Turn cold smoke switch toward green light. Place plug in power outlet. Turn timer switch knob to "2" hour setting.
8. Turn thermostat knob to "BAR-B-Q" position. (Amber and green lights should come on when thermostat is turned to "BAR-B-Q" position.) Charring element should get hot and inside of pot should get warm.

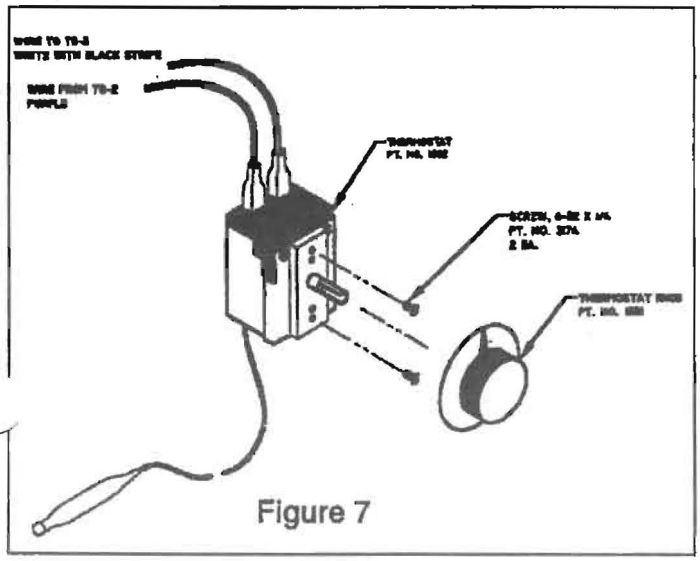


Figure 7

HOW TO REPLACE CHARRING ELEMENT

Pt. No. 1760
See Figure 8

To remove old element:

1. Remove back panel as outlined on page 20 "How to Remove Back Panel".
2. Remove charring element lead terminals from terminal strip TB-3 and TB-4.
3. Remove complete charring element by un screwing fitting with an adjustable end wrench. This fitting is located in back of charring element housing which is in back of cooker.

To install new element:

1. Place anti-seize compound or teflon tape on pipe threads of charring element housing.
2. Tighten charring element into place with adjustable end wrench.
3. Replace electrical connections. One lead fastens to TB-3 on terminal strip the other fastens to TB-4 on terminal strip. See terminal designation on wiring diagrams on pages 30, 31 and 32.
4. Test by plugging power cord into power and turning on timer switch, the charring element should become hot to touch immediately.
5. Replace back panel.

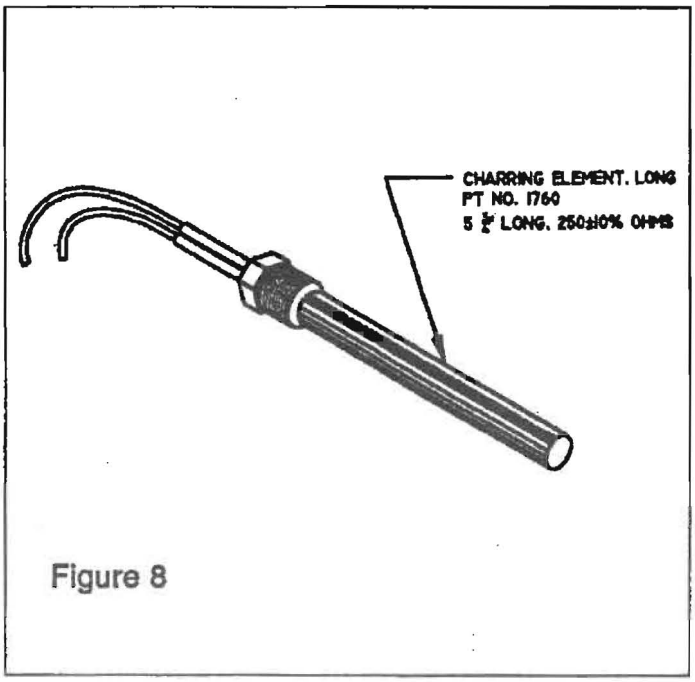


Figure 8

HOW TO REPLACE PRESSURE SWITCH

Pt No. 1003
See Figure 9

To remove old pressure switch:

1. Remove back panel as outlined on page 20.
2. Remove wires (2) from pressure switch terminals.
3. Unscrew pressure switch from manifold using 3/4" open end wrench.

To install new pressure switch:

1. Screw pressure switch on manifold using 3/4" open end wrench. (See Figure 9 below)
2. Set according to pressure setting in figure 10. (See "How to Adjust Pressure Switch.")
3. Replace back panel after installation is completed.

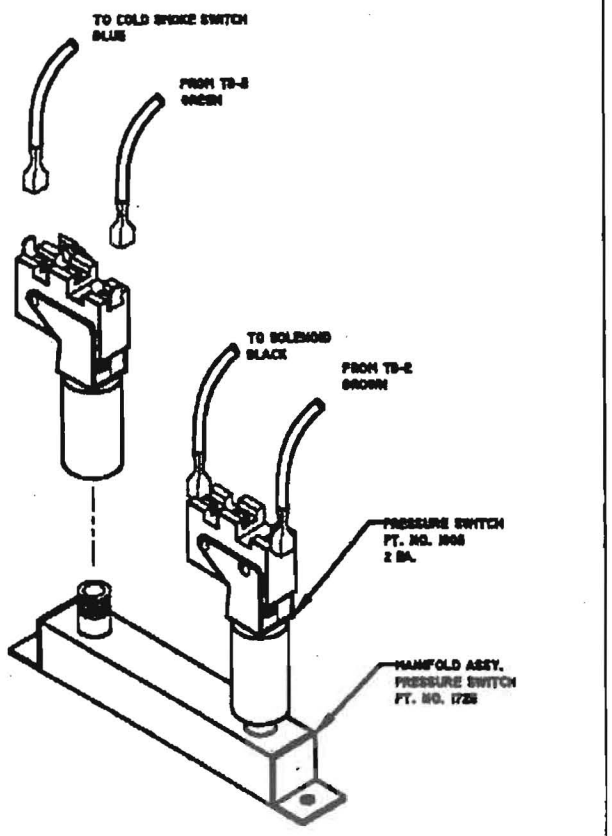


Figure 9

HOW TO ADJUST PRESSURE SWITCH

Pt. No. 1003

See Figure 10

Note: This procedure requires two people; one to observe gauge and one to make pressure setting. It can be done with one person by using a mirror mounted on lid such that gauge can be seen in mirror from the back.

1. Put quart of water in cooker.
2. Place top on cooker and tighten.
3. Turn power on by setting timer switch to "1" hour.
4. Let pressure build to approximately 15 lbs. While pressure is building, adjust the right side pressure switch (No. 2) counterclockwise as viewed from top until solenoid releases pressure.
5. Continue to adjust until solenoid relieve pressure at between 14 to 15 psi on the gauge in face plate (approximately 14 1/2 psi).
6. Now relieve pressure by opening ejector valv until gauge reads approximately 10 psi. Turn knurled adjustment screw until green light goes out (left pressure switch, No. 1) at 12 psi. The power relay will open at this point and heat is removed. Repeat this step until this setting is as 12 psi.

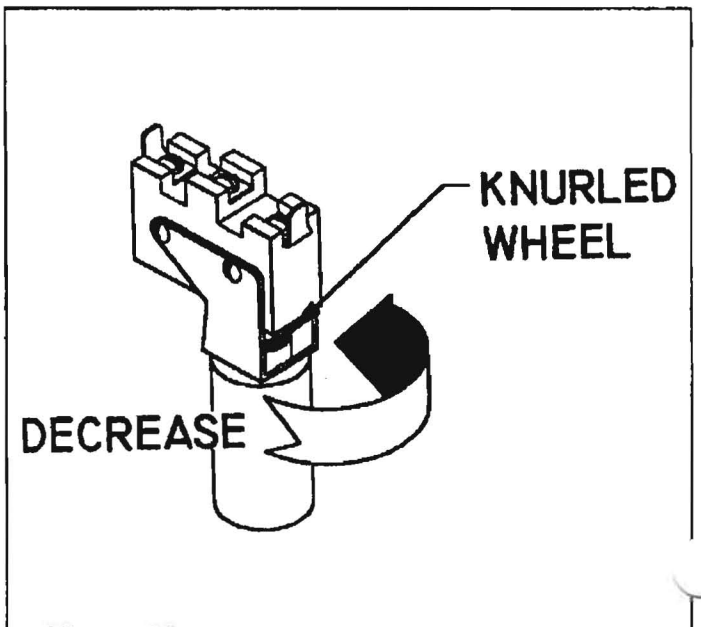


Figure 10

HOW TO REPLACE SINGLE PHASE POWER RELAY

(Part No. 0317) See Figure 11

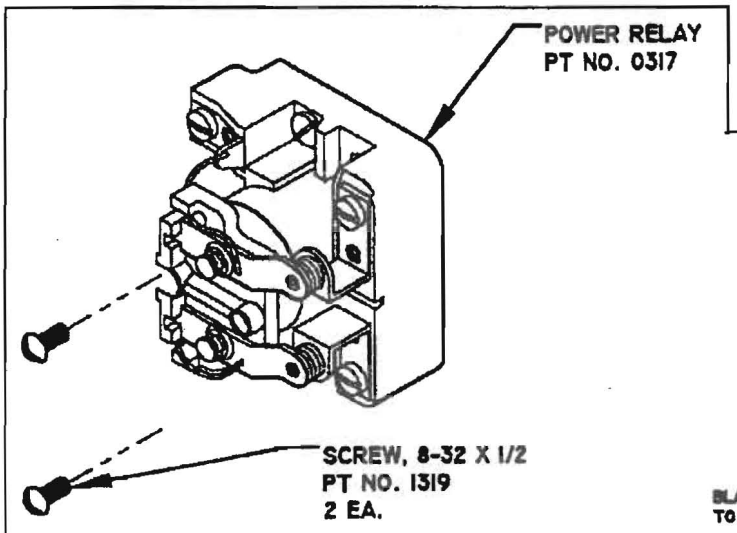
To remove old power relay:

1. Remove back panel as outlined on page 20.
2. Remove all wires from power relay terminals.
3. Remove defective relay by unscrewing two 8-32 screws attaching it to control box.

To replace new power relay:

1. Attach new relay with two 8-32 screws to control box.
2. Replace all wires as shown in Figure 11 below.

Caution: If you use a DPDT relay, make sure that the lead from relay to heating element terminals are on the normally open relay terminals.



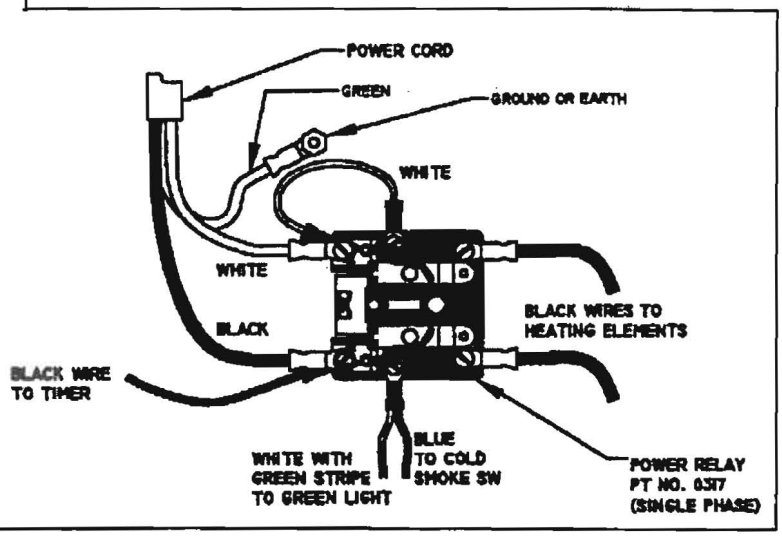


Figure 11

HOW TO REPLACE THREE PHASE POWER RELAY

(Part No. 1511) See Figure 12

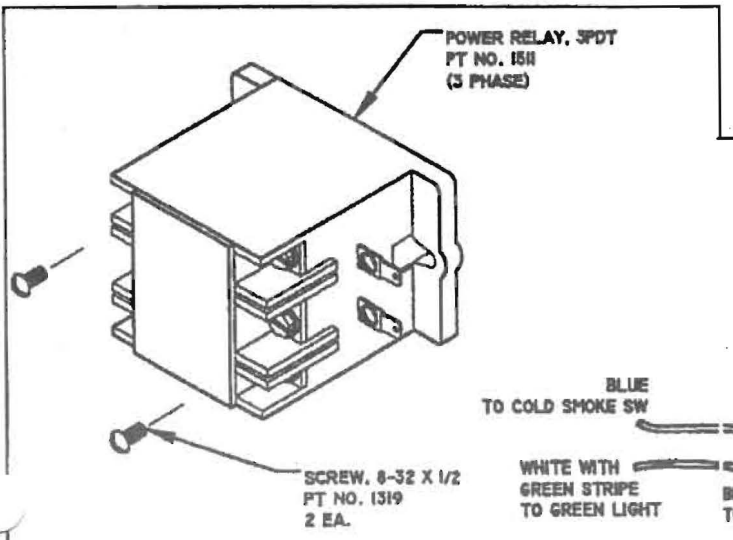
To remove old power relay:

1. Remove back panel as outlined on page 20.
2. Remove all wires from power relay terminals.
3. Remove defective relay by unscrewing two 8-32 screws attaching it to control box.

To replace new power relay:

1. Attach new relay with two 8-32 screws to control box.
2. Replace all wires as shown inFigure 12 below.

Caution: If you use a DPDT relay, make sure that the lead from relay to heating element terminals are on the normally open relay terminals.



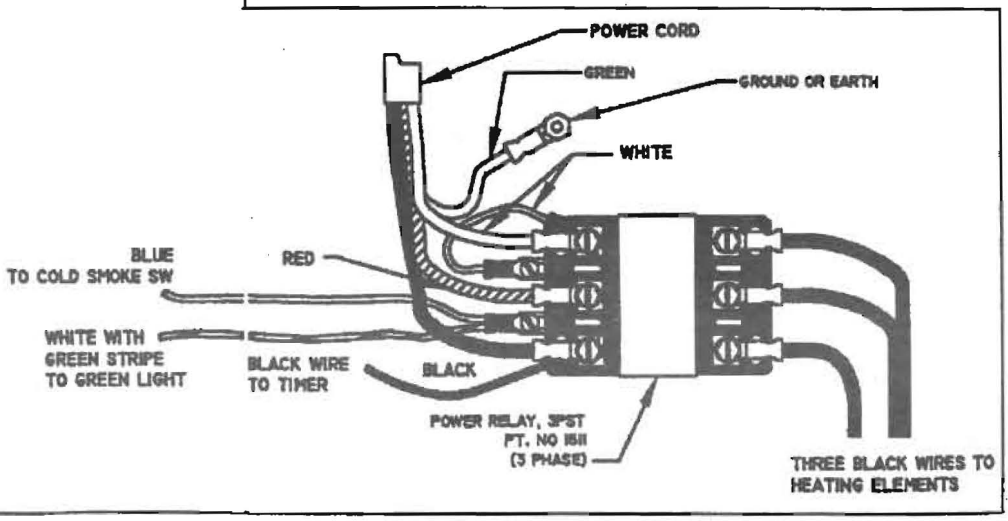


Figure 12

SINGLE PHASE TO THREE PHASE CONVERSION KIT

(Part No. 2260 and 2265)

Single phase to three phase converison kits are available. They are part number 2260 for lower voltage (208 - 240 volts, Delta) and part number 2265 for higher voltage (380/415, Wye). The kit consists of a power cord with cap, 3 pole relay, 2 element wires, and one flexible jumper to wire the elements in "Delta". An extr element wire is provided in Part No. 2265 for conversion to the higher voltage for connecting from the "Wye" neutral to the system neutral, if required. Most U.S. three phase installations will be a lower voltage, 208 to 240 volts (Delta). However, the cooker can be wired for a higher voltage of 415 volt (Wye) operation. Most international installation in 3 phase will be 220 volts (Delta) for the lower voltage. However, the cooker can be wired for 380 volts (Wye) operation for the higher voltage. if you need to convert a single unit to 3 phase, order the conversion kit and connect the elements as follows.

LOW VOLTAGE (208 TO 240 VOLTS)

"DELTA"

PART NO. 2260

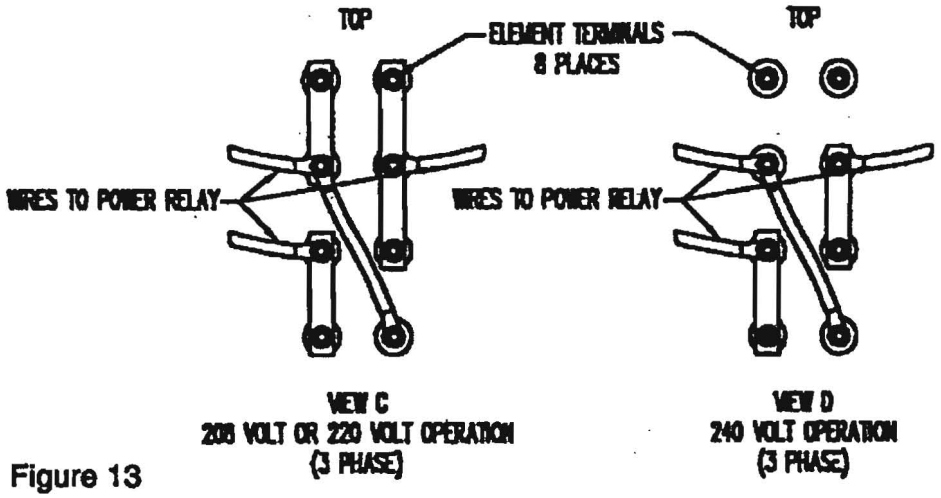


Figure 13

LOW VOLTAGE (380/415 VOLTS)

"WYE"

PART NO. 2265

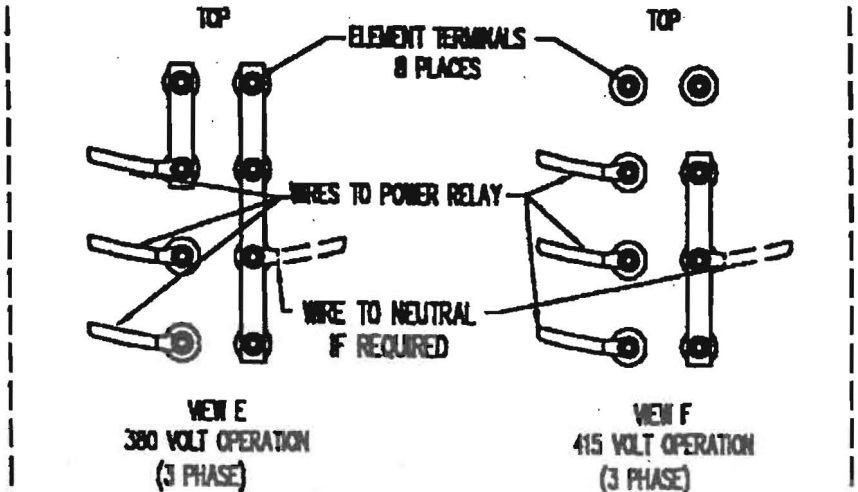


Figure 14

HOW TO REPLACE SOLENOID VALVE

(Part No. 1004) (See Figure 15)

To remove old solenoid valves:

1. Remove back panel as outlined on page 20.
2. Remove lead going from solenoid to pressure switch No. 2 (right pressure) by disconnecting from pressure switch terminal.
3. Remove lead from solenoid to TB-5 on terminal strip by disconnecting from terminal strip.
4. Disconnect hose from exhaust port to solenoid valve at the solenoid valve (bottom hose).
5. Disconnect hose from solenoid to muffler coupling at the muffler connection first then disconnect other end of hose from solenoid.
6. Remove two 8-32 nuts attaching solenoid to mounting bracket.
7. Remove fitting from bottom of solenoid.
8. The solenoid may be repaired, if it is not otherwise damaged (see How To Repair Solenoid, page 26). Otherwise, replace witih new solenoid.

To install new solenoid valve:

1. Replace fitting in bottom solenoid hand tight and then tighten three more turns with a 9/16" wrench. Then reconnect 6" hose to fitting.
2. Replace 6" hose in right side of solenoid hand tight and then tighten three more turns with a 9/16" wrench.
3. Mount new solenoid valve on mounting bracket with 8-32 nuts.
4. Reconnect one lead (slip on terminal) to spade terminal on pressure switch No. 2 (right pressure switch). See Figure 9, page 22.
5. Reconnect second lead (fork terminal) to screw terminal on TB-5 on terminal strip.
6. Reconnect hose to muffler coupling.
7. Test by putting a quart of water in cooker, placing on cooker top, and turning on cooker to see if solenoid will allow cooker to build up pressure. After pressure builds up to approximately 14 1/2 psi, solenoid should exhaust allowing pressure to drop to approximately 13 1/2 psi, and then stop exhausting. If it needs adjusting, see "How to Adjust Pressure Switch", on page 20.

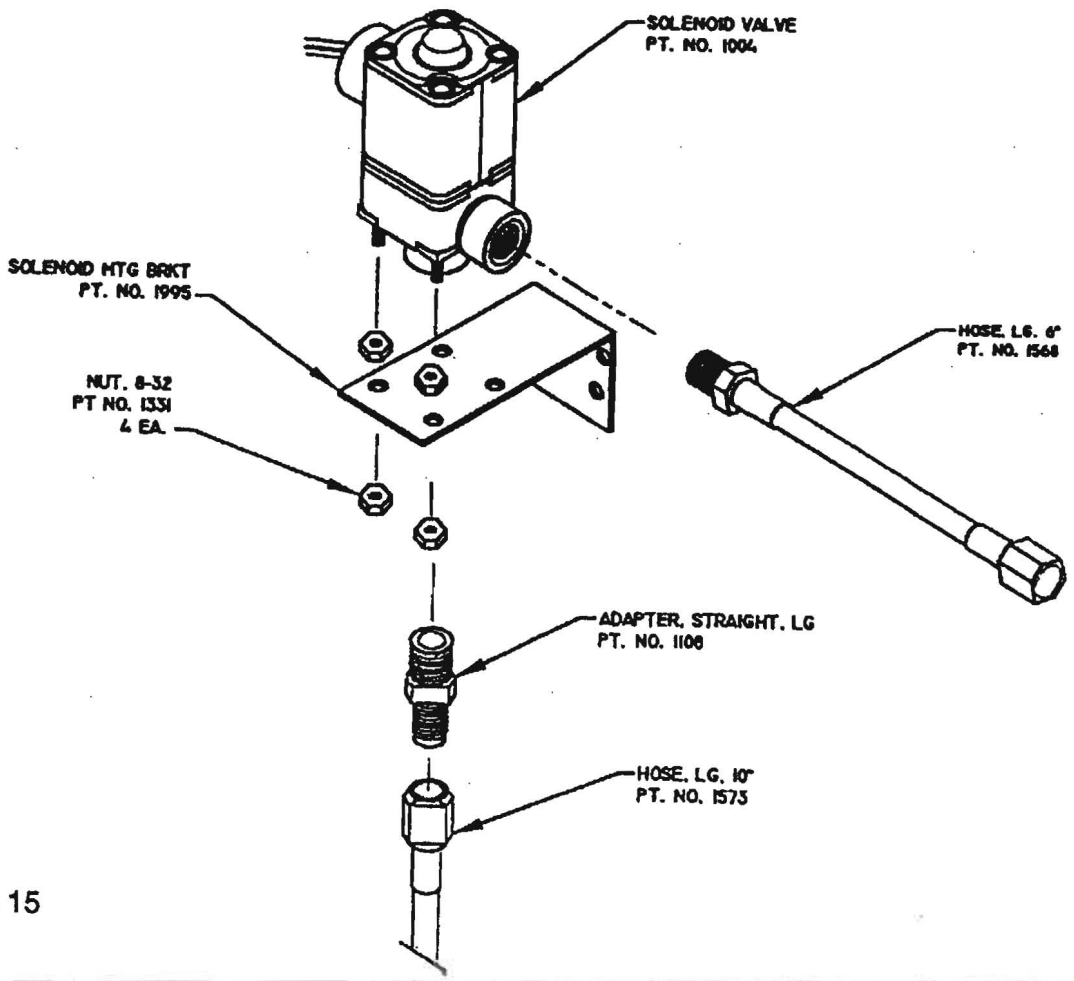


Figure 15

HOW TO REPAIR SOLENOID VALVE

(USE TEFLON SEAL REPAIR KIT – PART NO. 1013))

The solenoid is a very expensive part. Many times it can be repaired at a much lesser cost than buying a new solenoid. The repairs consist of replacing the coil if it is burnt out or, most generaly replacing the Teflon seal with a Teflon Seal Kit, Pt. No. 1013. It is very important that the solenoid be reassembled correctly or it will not work when put back together.

To disassemble solenoid, see Figure 16, page 27 and follow instructions below:

1. Unscrew four 8-32 screws (Item No. 3) from nuts (Item No. 16) as shown.
2. Remove screws, coil housing (Item No. 6), compression ring (Item No. 10) and activator guide (Item No. 12). Then remove rubber diaphragm and Teflon seal (Items No. 13 and 14). These last two items are normally together. Once these are removed you may then look and see if the Teflon base is stopped up. If it is, it must be cleaned. Do not use old seal. The reason for this is, once the valve has been in operation, the Teflon seal tends to make a permanent "set" and will not seal correctly. Use Teflon Seal Repair Kit, Pt. No. 1013. This seal is very, very costly and runs approximately 1/3 the price of the valve. So don't be alarmed when you purchase one. However, it is cheaper than buying a new valve.
3. If the coil is good, it is not necessary to disassemble the coil housing. To determine whether the coil is good, measure the continuity between the two black leads coming out of the front of the coil housing with a digital voltmeter. It should read about 810 ohms. If it reads infinite ohms, the coil is bad. Replace it by proceeding to Paragraph 4, below. If the coil is good, skip Paragraph 4 and proceed to reassembling solenoid.
4. To replace the coil, remove the retainer clip (Item No. 5). You may then remove the two ends and slip the old coil out (Item No. 7). Replace with a new coil. To reassemble the coil housing, put in new coils from the bottom sliding the two black leads through the front threaded outlet. Place composition paper insulating rings on each end. Place plunger tube (Item No. 20) in place then place square plate on other end. To lock in place, press the retainer clip on top of the plunger. Then reassemble the rest of the solenoid as shown in Figure 16, page 27.

To reassemble solenoid:

1. Clean base by soaking in a strong soap solution.
2. After base is cleaned and dried, replace with new Teflon seal (Item No. 14) domed side up in Teflon base (Item No. 15) cavity.
3. Next place rubber diaphram (Item No. 13) in base cavity on top of Teflon seal (Item No. 14).
4. Place activator guide (Item No. 12) in cavity on top of rubber diaphragm (Item No. 13).
5. Place plunger activator (No. 11) in hole of activator guide (Item No. 12).
6. Place compression ring (Item No. 10) base cavity on top of activator guide (Item No. 12).
7. Place compression plate (Item No. 9) on top of compression ring (Item No. 10).
8. Place plunger pin (Item No. 8) in coil housing (Item No. 6) hole on bottom of coil housing with little end up. **Important:** Little end must be up or solenoid will not work.
9. Place plunger (Item No. 4) in hole on top of coil housing (Item No. 6). **Important:** Small hole in flat part of plunger should be down with plunger and plunger pin correctly in place, there should be some give or "spring" when plunger pin is pressed against bottom of plunger. Note: If retainer clip (Item No. 5) is not in place, it will cause solenoid to chatter.
10. Place coil housing assembly (Item No. 6) on top of Teflon base (Item No. 15) with wire outlet opposite hose outlet. Make sure plunger pin (Item No. 8) remains in correct position in coil housing during assembly.
11. Tighten assembly together by tightening four 8-32 nuts on screws.
12. Reconnect hose and wires and test as described in "How to Replace Solenoid Valve", page 25.

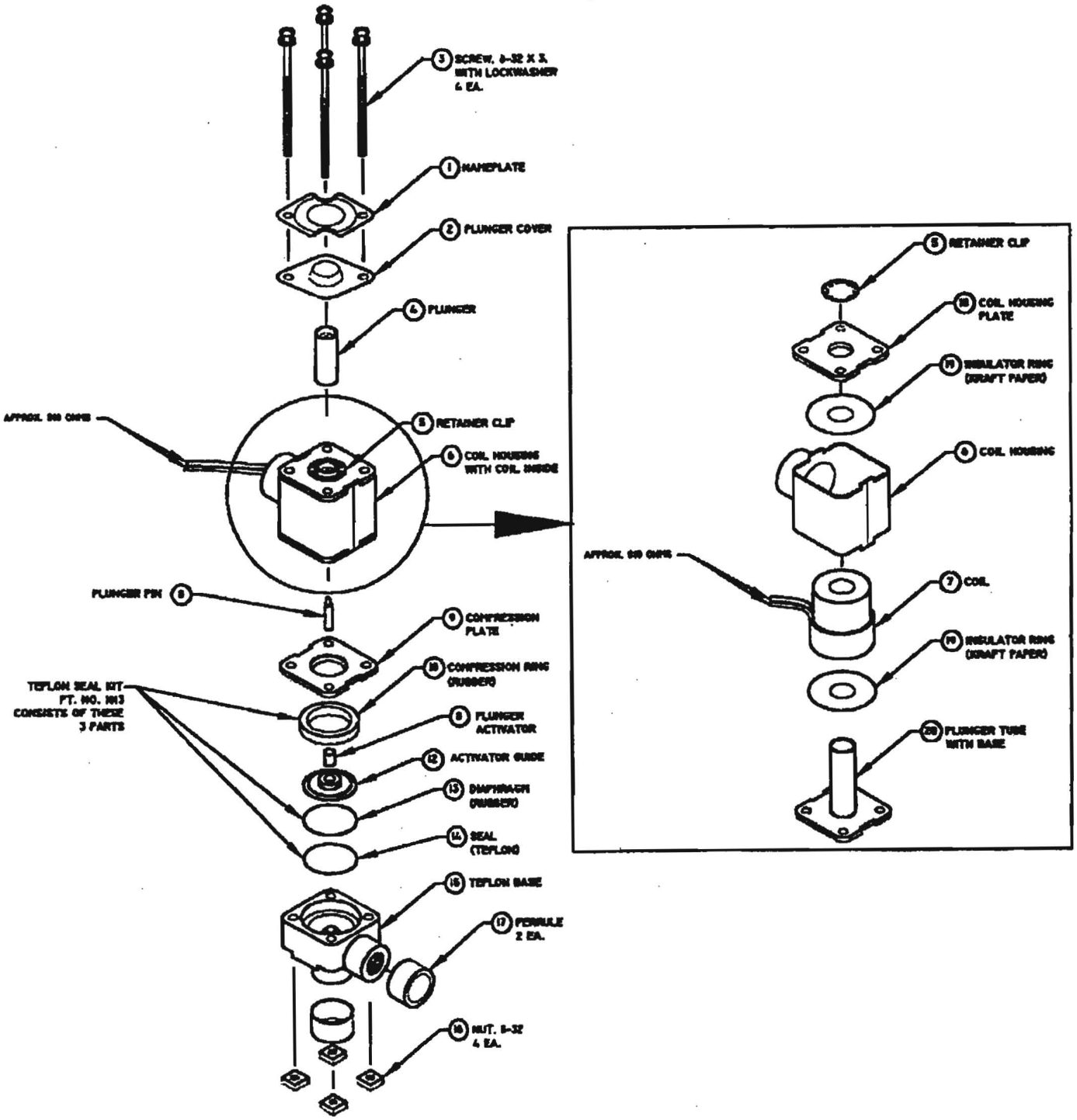

3 SCREW, 8-32 X 3, WITH LOCKWASHER 4 EA.
1 NAMEPLATE
2 PLUNGER COVER
4 PLUNGER
APPROX. 500 OHMS
5 RETAINER CLIP
6 COIL HOUSING WITH COIL INSIDE
PLUNGER PIN 8
9 COMPRESSION PLATE
10 COMPRESSION RING (RUBBER)
TEFLON SEAL KIT PT. NO. 913 CONSISTS OF THESE 3 PARTS
8 PLUNGER ACTIVATOR
12 ACTIVATOR GUIDE
13 DIAPHRAGM (RUBBER)
14 SEAL (TEFLON)
16 TEFLON BASE
17 FERRULE 2 EA.
16 NUT, 8-32 4 EA.
5 RETAINER CLIP
11 COIL HOUSING PLATE
19 INSULATOR RING (KRAFT PAPER)
6 COIL HOUSING
APPROX. 500 OHMS
7 COIL
19 INSULATOR RING (KRAFT PAPER)
20 PLUNGER TUBE WITH BASE

Figure 16

HOW TO CHANGE MAIN HEATING ELEMENTS

(Part No. 5810, BB)
(Part No. 1810, BC & BCD)
See Figure 17

Note: It is not necessary to change elements to match voltage on which the unit is actually operating. For example, to change from a 240V machine to a 208V machine (or just the opposite), it is a matter of dropping one element or adding one. See, wiring diagrams on pages 30, 31 and 32.

To determine a defective element, follow this procedure:

1. Remove back panel and bottom control panel cover as outlined in, "How to Remove Back Panels" on page 20.
2. Remove two wires and jumper busses from main elements. In each machine, there are four elements. Therefore, you must remove eight nuts, washers, and two each short jumper and long jumper busses.
3. Determine defective element by measuring resistance with an ohmmeter. The resistance will be 37.4 ohms for a BB and 35 ohms for a BC and BCD element. The element is defective if it does not read the specified ohms ± 5%. If the element is burned out, it will either measure less ohms than shown above or infinite ohms. That is, it will either show "short to ground" or an open circuit. In either event, the element must be replaced. In each model, the four elements are the same wattage. In the BB, each element is rated at 1540 watts at 240V. In the BC and BCD, each element is 1650 watts at 240V.

To replace the element, see Figure 17 on page 29 and follow instructions below:

1. Remove four 10-24 truss head screws from red skirt cover and remove it.
2. Remove 3/8 nut which fasten the drain valve handle adapter to the drain valve. Pull drain valve handle and adapter forward.
3. Remove bottom control panel assembly by removing four #10 sheet metal screws.
4. Remove element end cap by removing four #10 sheet metal screws.
5. Remove nine 10-24 truss head screws which fasten the top to the bottom cabinet assembly and remove bottom cabinet assembly.
6. Remove insulation clamp band by removing three 10-24 nuts holding the insulation clamp band to the top. Then remove two 1/4-20 bolts from the front of the clamp band. The clamp and will then flex enough to slip off cooker.
7. Remove the insulation from the heat chamber only.
8. Remove two 1/4-20 bolts from the element clamp band. Remove element clamp and by spreading and removing.
9. Remove defective element by spreading and removing.
10. Replace defective element with good element.
11. Place clamp band in place and tighten two 1/4-20 bolts.
12. Replace heat chamber insulation.
13. Replace insulation clamp band by bolting two 1/4-20 on the front lips then fasten to the top with three 10-24 nuts.
14. Replace element end cap by fastening to insulatio clamp band with four #10 sheet metal screws.
15. Replace bottom control panel assembly by fastening to the insulation clamp band with four sheet metal screws.
16. Replace bottom cabinet assembly (with casters) and fasten to the top with nine 10-24 truss head screws.
17. Replace drain valve handle and adapter by screwing 3/8 nut onto drain valve stem. Align handle by loosening the alignment nut correctly positioning the drain valve handle. If the drain valve is closed, the correct position is horizontal to the cabinet and to the right.
18. Fasten red skirt cover to bottom of cooker cabinet with four 10-24 screws.
19. Turn cooker back over on its casters and reconnect wires and jumpers for the proper voltage. See, "Wiring Diagram", pages 30, 31 and 32.
20. Test unit with a quart of water and make any necessary adjustments to the pressure switch to be sur that they are adjusted to the proper values.
21. Fasten bottom control panel cover and back panel back in place.

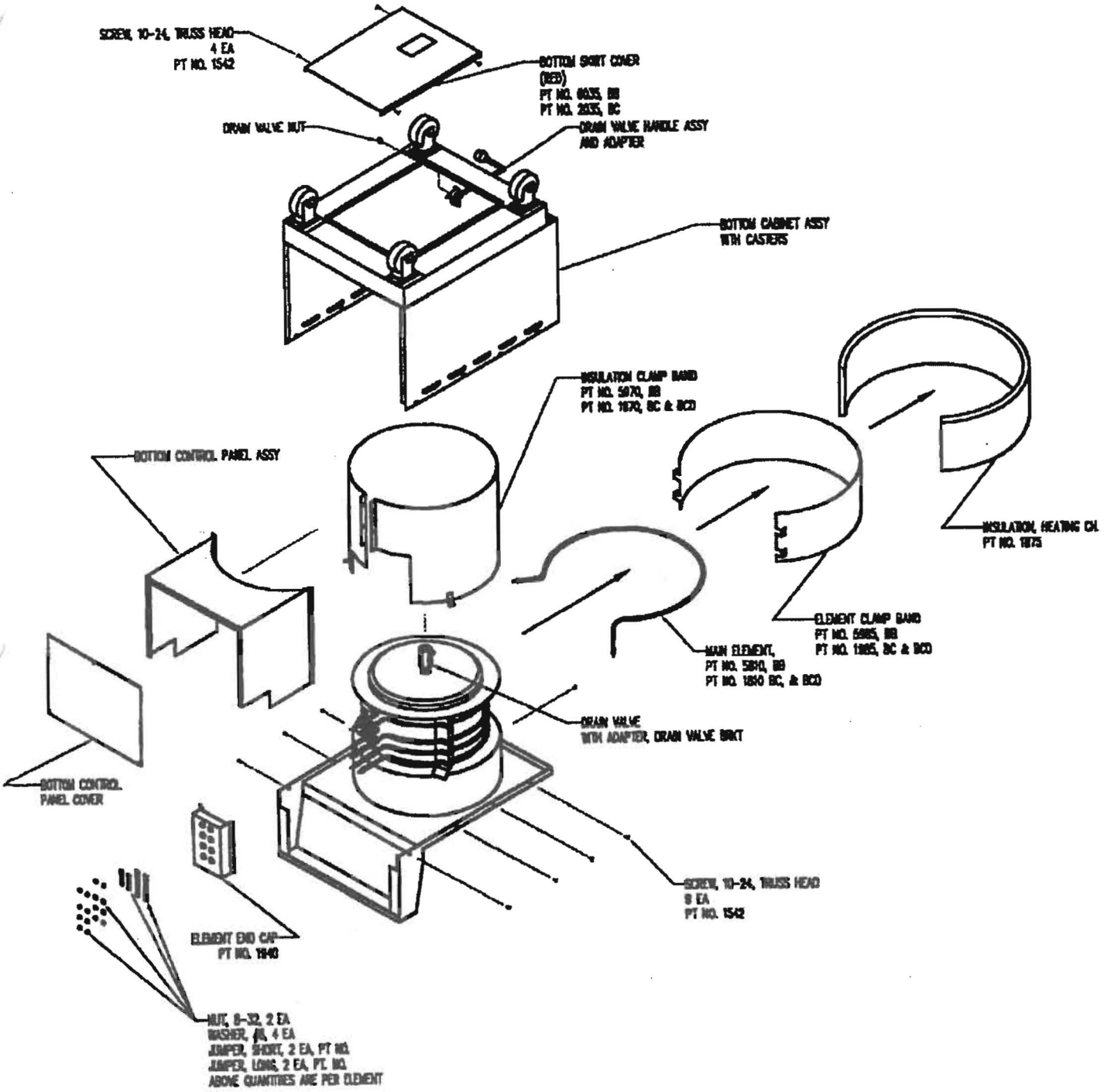
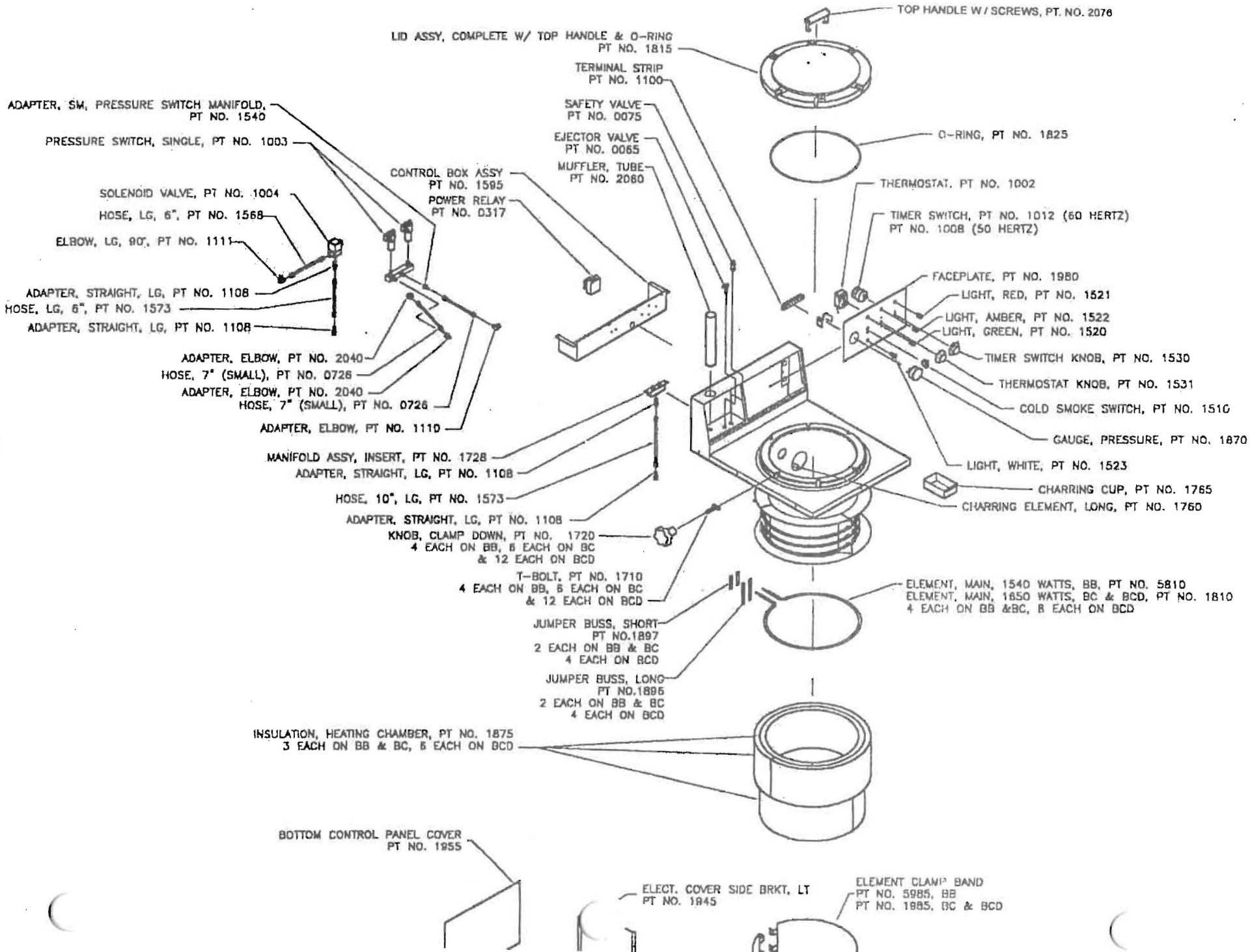
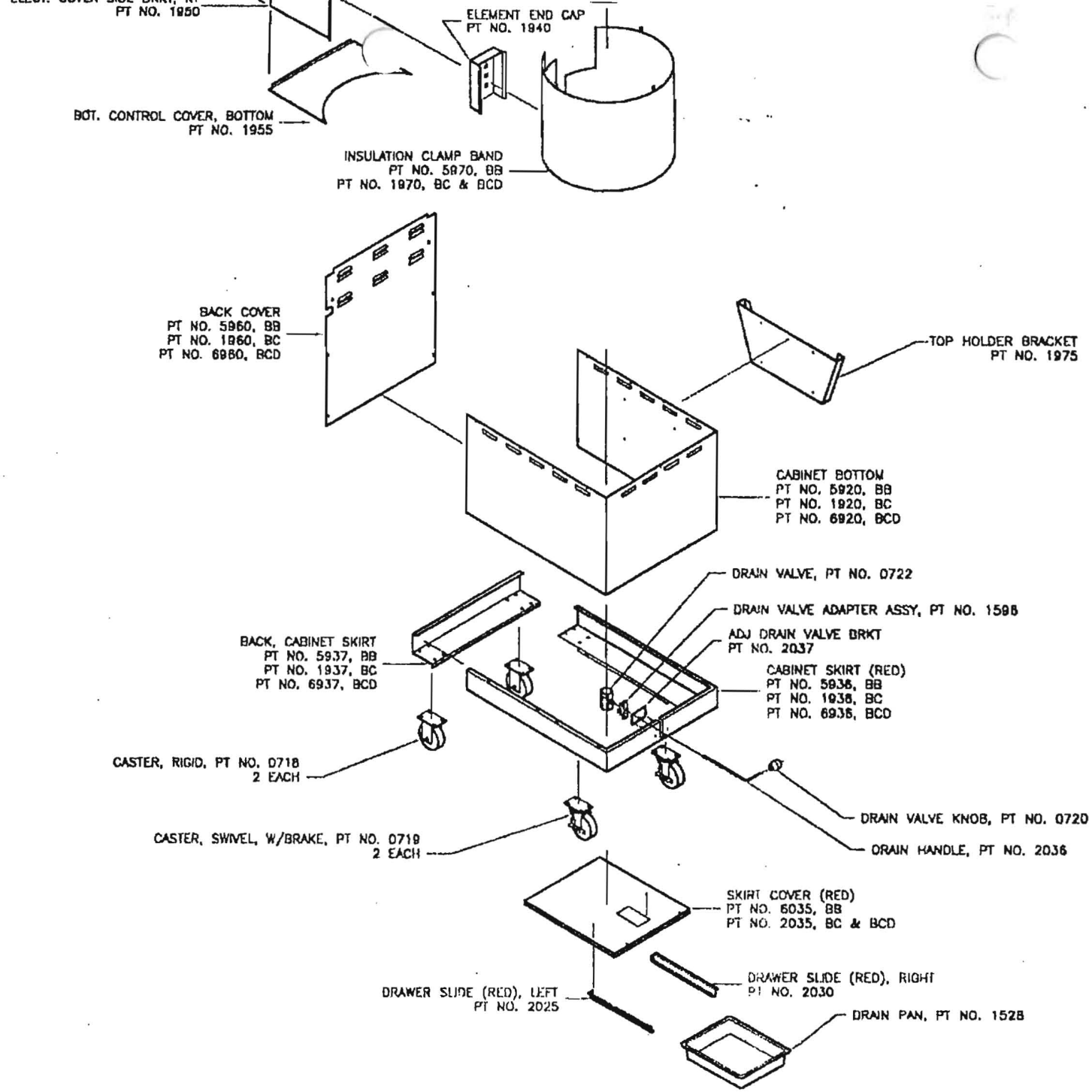
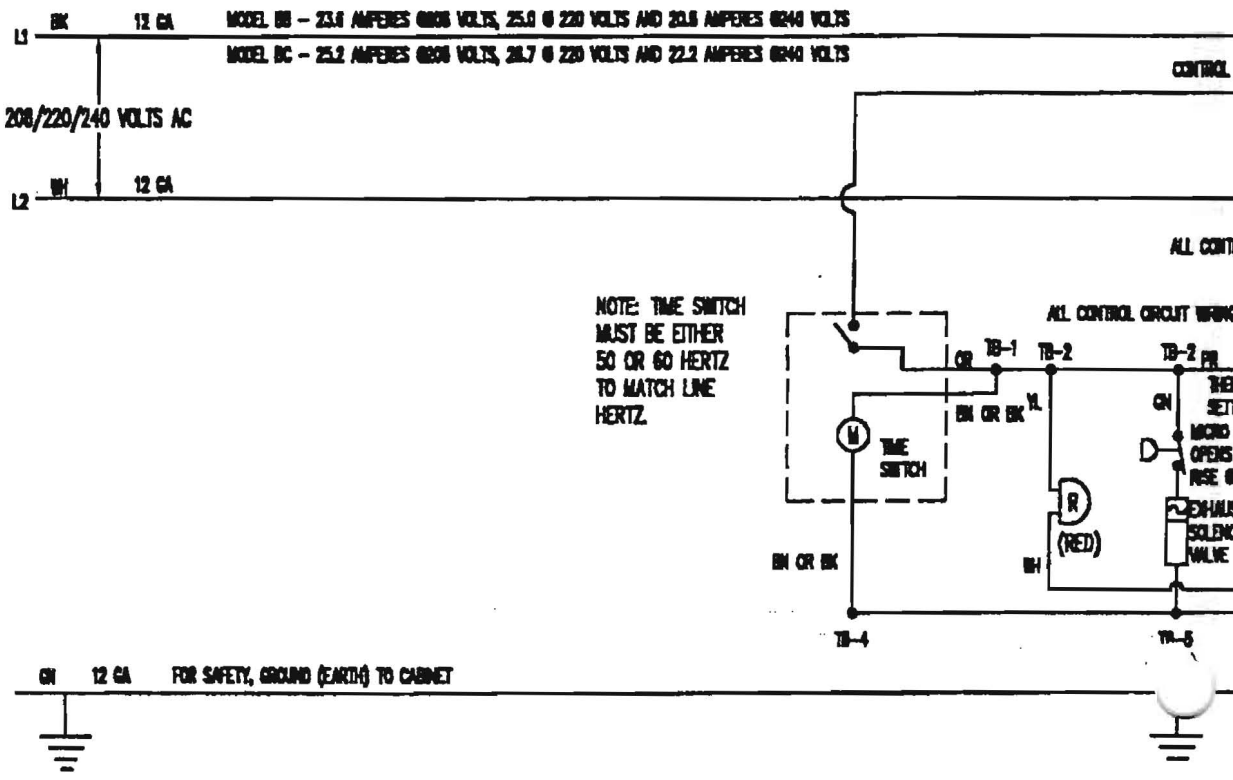
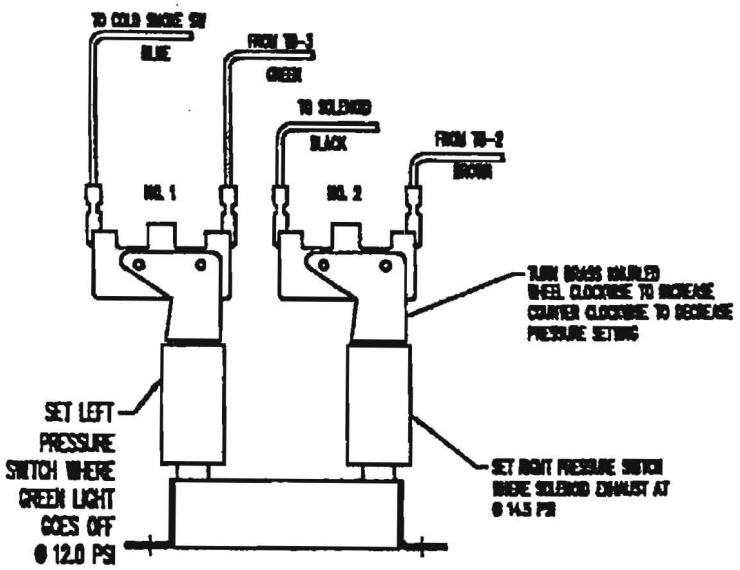

SCREW, 10-24, TRUSS HEAD
4 EA
PT NO. 1542
BOTTOM SKIRT COVER
(RED)
PT NO. 6035, BB
PT NO. 2035, BC
DRAIN VALVE NUT
DRAIN VALVE HANDLE ASSY
AND ADAPTER
BOTTOM CABINET ASSY
WITH CASTERS
INSULATION CLAMP BAND
PT NO. 5870, BB
PT NO. 1870, BC & BCD
BOTTOM CONTROL PANEL ASSY
INSULATION, HEATING CH.
PT NO. 1875
ELEMENT CLAMP BAND
PT NO. 5885, BB
PT NO. 1885, BC & BCD
MAIN ELEMENT,
PT NO. 5810, BB
PT NO. 1850 BC, & BCD
DRAIN VALVE
WITH ADAPTER, DRAIN VALVE BRKT
BOTTOM CONTROL
PANEL COVER
SCREW, 10-24, TRUSS HEAD
9 EA
PT NO. 1542
ELEMENT END CAP
PT NO. 1940
NUT, 8-32, 2 EA
WASHER, #8, 4 EA
JUMPER, SHORT, 2 EA, PT NO.
JUMPER, LONG, 2 EA, PT. NO.
ABOVE QUANTITIES ARE PER ELEMENT

Figure 17

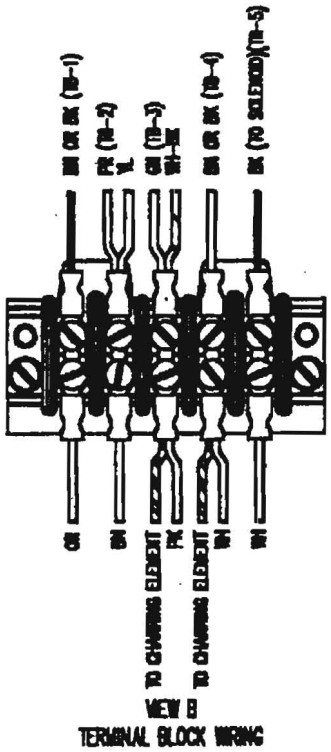

TOP HANDLE W/ SCREWS, PT. NO. 2076
LID ASSY, COMPLETE W/ TOP HANDLE & O-RING PT NO. 1815
TERMINAL STRIP PT NO. 1100
SAFETY VALVE PT NO. 0075
EJECTOR VALVE PT NO. 0065
MUFFLER, TUBE PT NO. 2080
O-RING, PT NO. 1825
THERMOSTAT, PT NO. 1002
TIMER SWITCH, PT NO. 1012 (60 HERTZ) PT NO. 1008 (50 HERTZ)
FACEPLATE, PT NO. 1980
LIGHT, RED, PT NO. 1521
LIGHT, AMBER, PT NO. 1522
LIGHT, GREEN, PT NO. 1520
TIMER SWITCH KNOB, PT NO. 1530
THERMOSTAT KNOB, PT NO. 1531
COLD SMOKE SWITCH, PT NO. 1510
GAUGE, PRESSURE, PT NO. 1870
LIGHT, WHITE, PT NO. 1523
CHARRING CUP, PT NO. 1765
CHARRING ELEMENT, LONG, PT NO. 1760
ADAPTER, SM, PRESSURE SWITCH MANIFOLD, PT NO. 1540
PRESSURE SWITCH, SINGLE, PT NO. 1003
CONTROL BOX ASSY PT NO. 1595
POWER RELAY PT NO. 0317
SOLENOID VALVE, PT NO. 1004
HOSE, LG, 6", PT NO. 1568
ELBOW, LG, 90°, PT NO. 1111
ADAPTER, STRAIGHT, LG, PT NO. 1108
HOSE, LG, 6", PT NO. 1573
ADAPTER, STRAIGHT, LG, PT NO. 1108
ADAPTER, ELBOW, PT NO. 2040
HOSE, 7" (SMALL), PT NO. 0726
ADAPTER, ELBOW, PT NO. 2040
HOSE, 7" (SMALL), PT NO. 0726
ADAPTER, ELBOW, PT NO. 1110
MANIFOLD ASSY, INSERT, PT NO. 1728
ADAPTER, STRAIGHT, LG, PT NO. 1108
HOSE, 10", LG, PT NO. 1573
ADAPTER, STRAIGHT, LG, PT NO. 1108
KNOB, CLAMP DOWN, PT NO. 1720 4 EACH ON BB, 6 EACH ON BC & 12 EACH ON BCD
T-BOLT, PT NO. 1710 4 EACH ON BB, 6 EACH ON BC & 12 EACH ON BCD
JUMPER BUSS, SHORT PT NO.1897 2 EACH ON BB & BC 4 EACH ON BCD
JUMPER BUSS, LONG PT NO.1895 2 EACH ON BB & BC 4 EACH ON BCD
ELEMENT, MAIN, 1540 WATTS, BB, PT NO. 5810
ELEMENT, MAIN, 1650 WATTS, BC & BCD, PT NO. 1810
4 EACH ON BB &BC, 8 EACH ON BCD
INSULATION, HEATING CHAMBER, PT NO. 1875 3 EACH ON BB & BC, 5 EACH ON BCD
BOTTOM CONTROL PANEL COVER PT NO. 1955
ELECT. COVER SIDE BRKT, LT PT NO. 1945
ELEMENT CLAMP BAND PT NO. 5985, BB PT NO. 1885, BC & BCD


ELEMENT END CAP
PT NO. 1940
BOT. CONTROL COVER, BOTTOM
PT NO. 1955
INSULATION CLAMP BAND
PT NO. 5970, BB
PT NO. 1970, BC & BCD
BACK COVER
PT NO. 5960, BB
PT NO. 1960, BC
PT NO. 6960, BCD
TOP HOLDER BRACKET
PT NO. 1975
CABINET BOTTOM
PT NO. 5920, BB
PT NO. 1920, BC
PT NO. 6920, BCD
DRAIN VALVE, PT NO. 0722
DRAIN VALVE ADAPTER ASSY, PT NO. 1598
ADJ DRAIN VALVE BRKT
PT NO. 2037
BACK, CABINET SKIRT
PT NO. 5937, BB
PT NO. 1937, BC
PT NO. 6937, BCD
CABINET SKIRT (RED)
PT NO. 5936, BB
PT NO. 1936, BC
PT NO. 6936, BCD
CASTER, RIGID, PT NO. 0718
2 EACH
DRAIN VALVE KNOB, PT NO. 0720
CASTER, SWIVEL, W/BRAKE, PT NO. 0719
2 EACH
DRAIN HANDLE, PT NO. 2036
SKIRT COVER (RED)
PT NO. 6035, BB
PT NO. 2035, BC & BCD
DRAWER SLIDE (RED), RIGHT
PT NO. 2030
DRAWER SLIDE (RED), LEFT
PT NO. 2025
DRAIN PAN, PT NO. 1528




TO COLD SMOKE SW
BLUE
FROM TB-1
GREEN
TO SOLENOID
BLACK
FROM TB-2
BROWN
NO. 1
NO. 2
TURN BRASS BARRELS WHEEL CLOCKWISE TO INCREASE COUNTER CLOCKWISE TO DECREASE PRESSURE SETTING
SET LEFT PRESSURE SWITCH WHERE GREEN LIGHT GOES OFF @ 12.0 PSI
SET RIGHT PRESSURE SWITCH WHERE SOLENOID EXHAUST AT @ 14.5 PSI

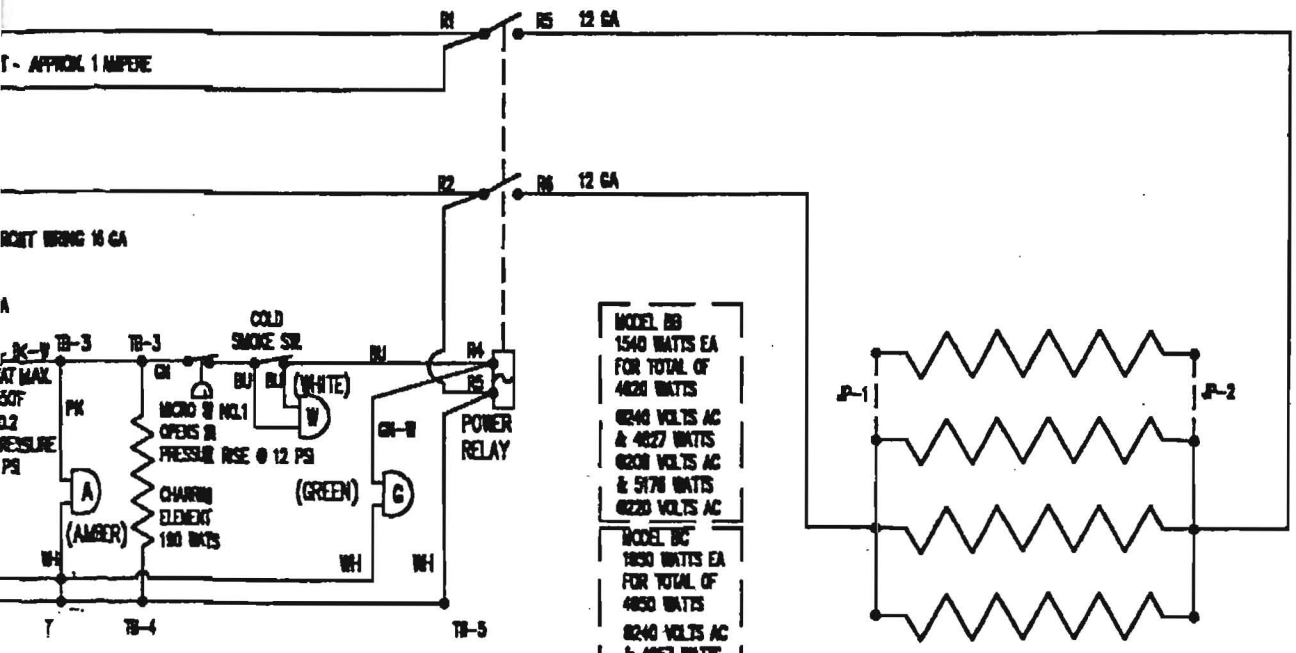
VIEW A
PRESSURE SWITCH SETTINGS



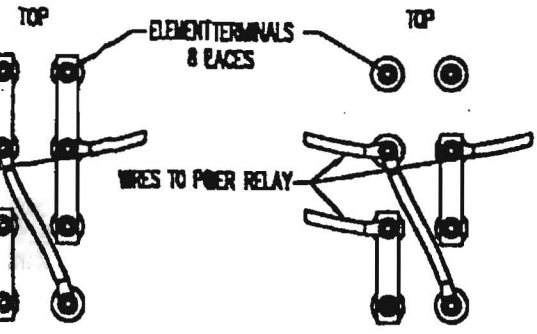
VIEW B
TERMINAL BLOCK WIRING

SCHEL WIRING DIAGRAM
MODELS BB AND BC

M EF WIRED FOR SINGLE PHASE
REE P AY AND A 4 WIRE CORD (AVAILABLE FROM FACTORY)
CONNECTIONS TO CHANGE TO THREE PHASE (DELTA)

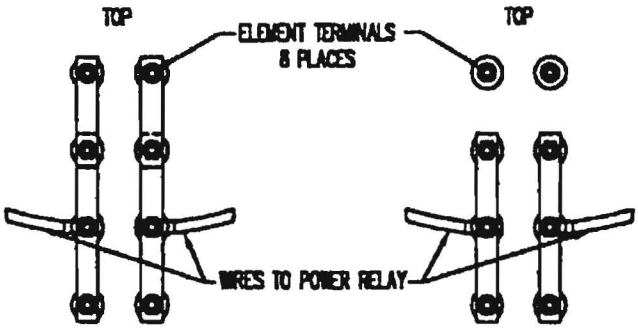


NOTE: FOR 208 VOLT OR 220 VOLT OPERATION ATTACH EXTRA
1540 WATT ELEMENT BY INSTALLING JUMPERS
JP-1 AND JP-2 AS SHOWN ABOVE
FOR 240 VOLT OPERATION CUT AND REMOVE JUMPER FROM
JP-1 AND JP-2
SEE VIEWS C & D BELOW



VIEW C
220 VOLT OPERATION
3 PHASE)

VIEW D
240 VOLT OPERATION
(3 PHASE)



VIEW C
208 VOLT OR 220 VOLT OPERATION
(SINGLE PHASE)

VIEW D
240 VOLT OPERATION
(SINGLE PHASE)

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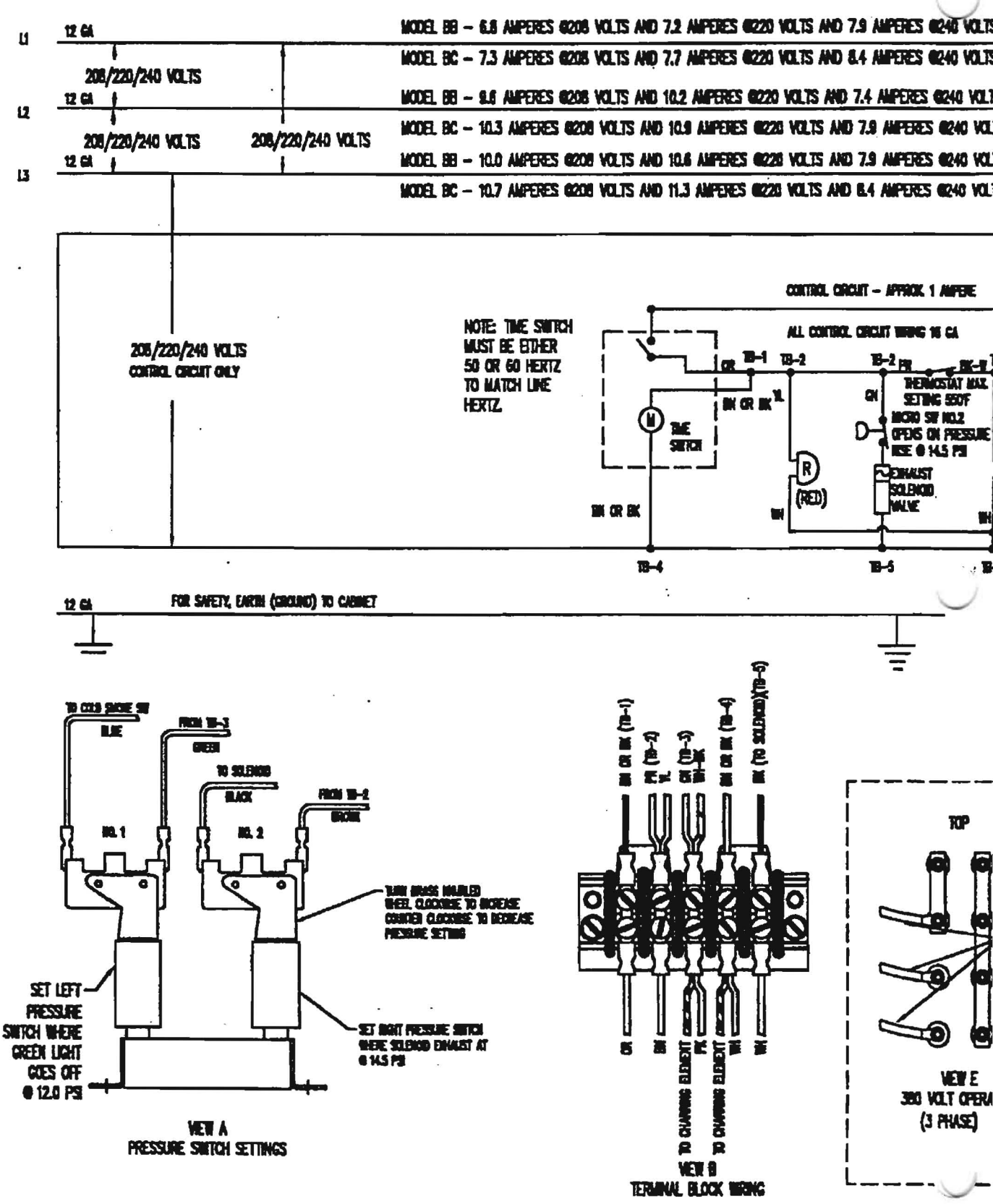
REV DATE: 02/23/01

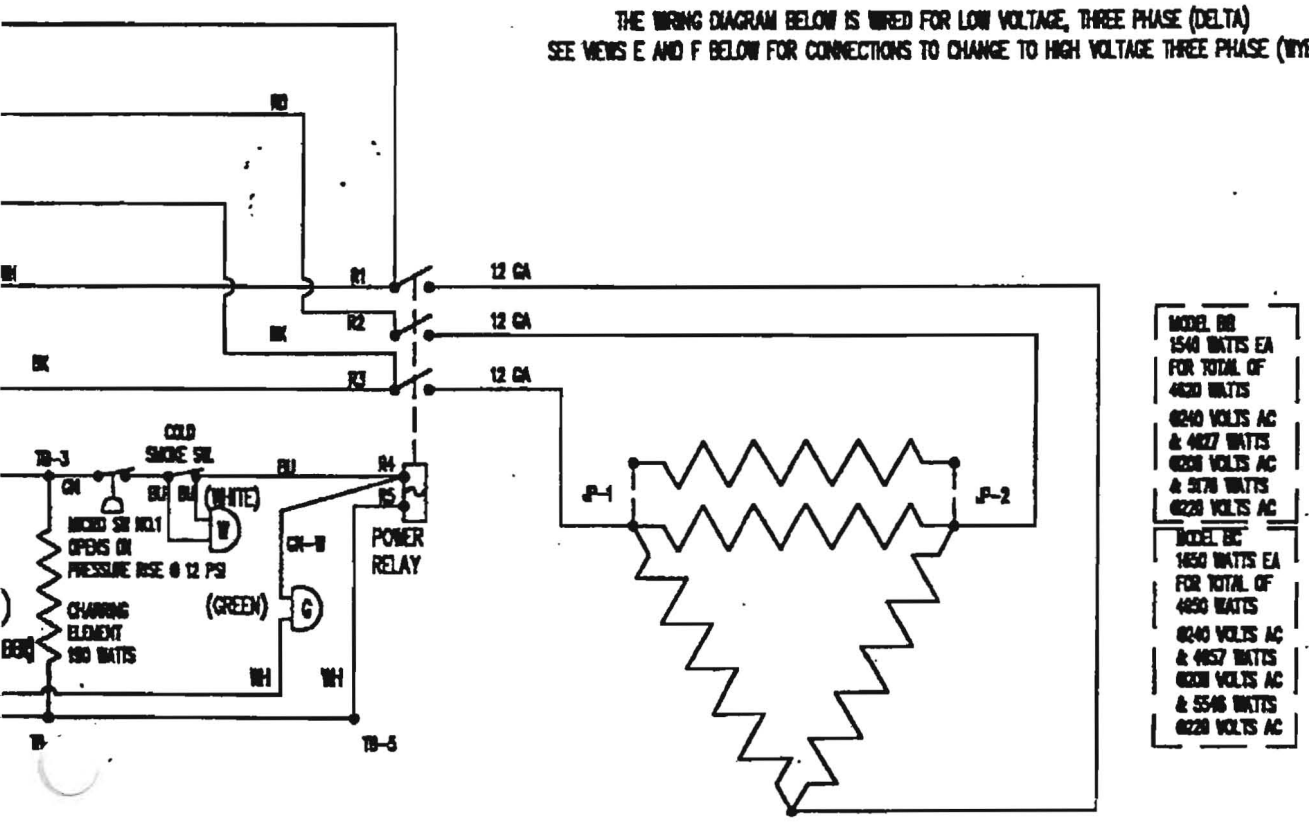

L1
12 GA
MODEL BB – 6.8 AMPERES @208 VOLTS AND 7.2 AMPERES @220 VOLTS AND 7.9 AMPERES @240 VOLTS
MODEL BC – 7.3 AMPERES @208 VOLTS AND 7.7 AMPERES @220 VOLTS AND 8.4 AMPERES @240 VOLTS
208/220/240 VOLTS
L2
12 GA
MODEL BB – 9.6 AMPERES @208 VOLTS AND 10.2 AMPERES @220 VOLTS AND 7.4 AMPERES @240 VOLTS
MODEL BC – 10.3 AMPERES @208 VOLTS AND 10.9 AMPERES @220 VOLTS AND 7.9 AMPERES @240 VOLTS
208/220/240 VOLTS
208/220/240 VOLTS
L3
12 GA
MODEL BB – 10.0 AMPERES @208 VOLTS AND 10.6 AMPERES @220 VOLTS AND 7.9 AMPERES @240 VOLTS
MODEL BC – 10.7 AMPERES @208 VOLTS AND 11.3 AMPERES @220 VOLTS AND 8.4 AMPERES @240 VOLTS
208/220/240 VOLTS
CONTROL CIRCUIT ONLY
CONTROL CIRCUIT – APPROX. 1 AMPERE
NOTE: TIME SWITCH MUST BE EITHER 50 OR 60 HERTZ TO MATCH LINE HERTZ.
ALL CONTROL CIRCUIT WIRING 16 GA
TB-1
TB-2
TB-2 PR
THERMOSTAT MAX. SETTING 550F
MICRO SW NO.2 OPENS ON PRESSURE RISE @ 14.5 PSI
BK OR BK
TIME SWITCH
R
(RED)
EXHAUST SOLENOID VALVE
BK OR BK
TB-4
TB-5
12 GA
FOR SAFETY, EARTH (GROUND) TO CABINET
TO COIL SUCTION SW
BLUE
FROM TB-3
GREEN
TO SOLENOID
BLACK
FROM TB-2
BROWN
NO. 1
NO. 2
TURN BRASS NUT(S) CLOCKWISE TO INCREASE COUNTER CLOCKWISE TO DECREASE PRESSURE SETTING
SET LEFT PRESSURE SWITCH WHERE GREEN LIGHT GOES OFF @ 12.0 PSI
SET RIGHT PRESSURE SWITCH WHERE SOLENOID EXHAUST AT @ 14.5 PSI
VIEW A
PRESSURE SWITCH SETTINGS
TO SOLENOID (BK)
TO CHARGING ELEMENT
TO CHARGING ELEMENT
BK
BK
BK
BK
BK
BK
VIEW B
TERMINAL BLOCK WIRING
TOP
VIEW E
380 VOLT OPERA
(3 PHASE)

Smokaroma

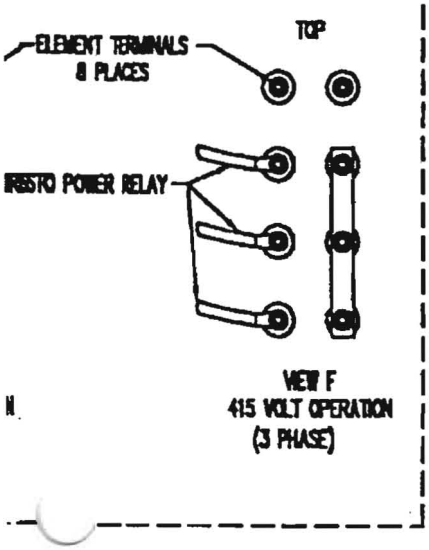
P.O. BOX [illegible], [illegible], OKLAHOMA [illegible] ([illegible]) [illegible]-[illegible]

LADDER SCHEMATIC WIRING DIAGRAM
MODELS BB AND BC

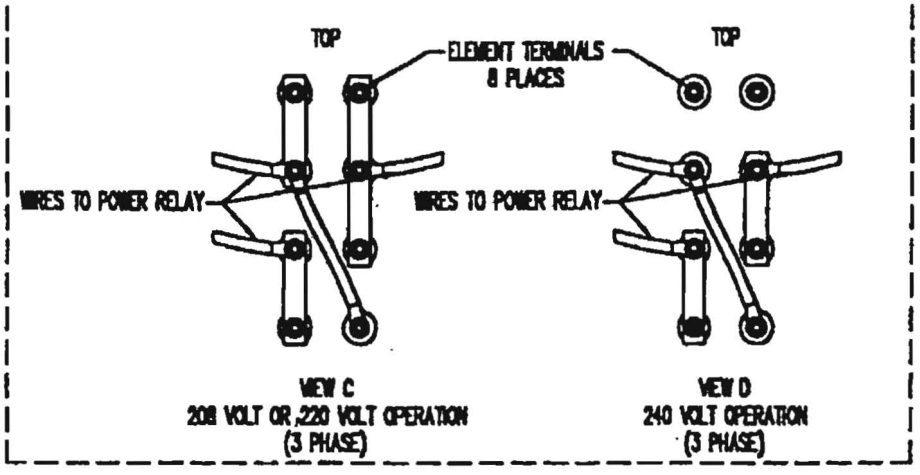
THE WIRING DIAGRAM BELOW IS WIRED FOR LOW VOLTAGE, THREE PHASE (DELTA)
SEE VIEWS E AND F BELOW FOR CONNECTIONS TO CHANGE TO HIGH VOLTAGE THREE PHASE (WYE)



NOTE: FOR 208 VOLT OR 220 VOLT OPERATION ATTACH EXTRA
1540 WATT ELEMENT BY INSTALLING JUMPERS
JP-1 AND JP-2 AS SHOWN ABOVE
FOR 240 VOLT OPERATION CUT AND REMOVE JUMPER FROM
JP-1 AND JP-2
SEE VIEWS C & D BELOW



VIEW F
415 VOLT OPERATION
(3 PHASE)



VIEW C
208 VOLT OR 220 VOLT OPERATION
(3 PHASE)

VIEW D
240 VOLT OPERATION
(3 PHASE)

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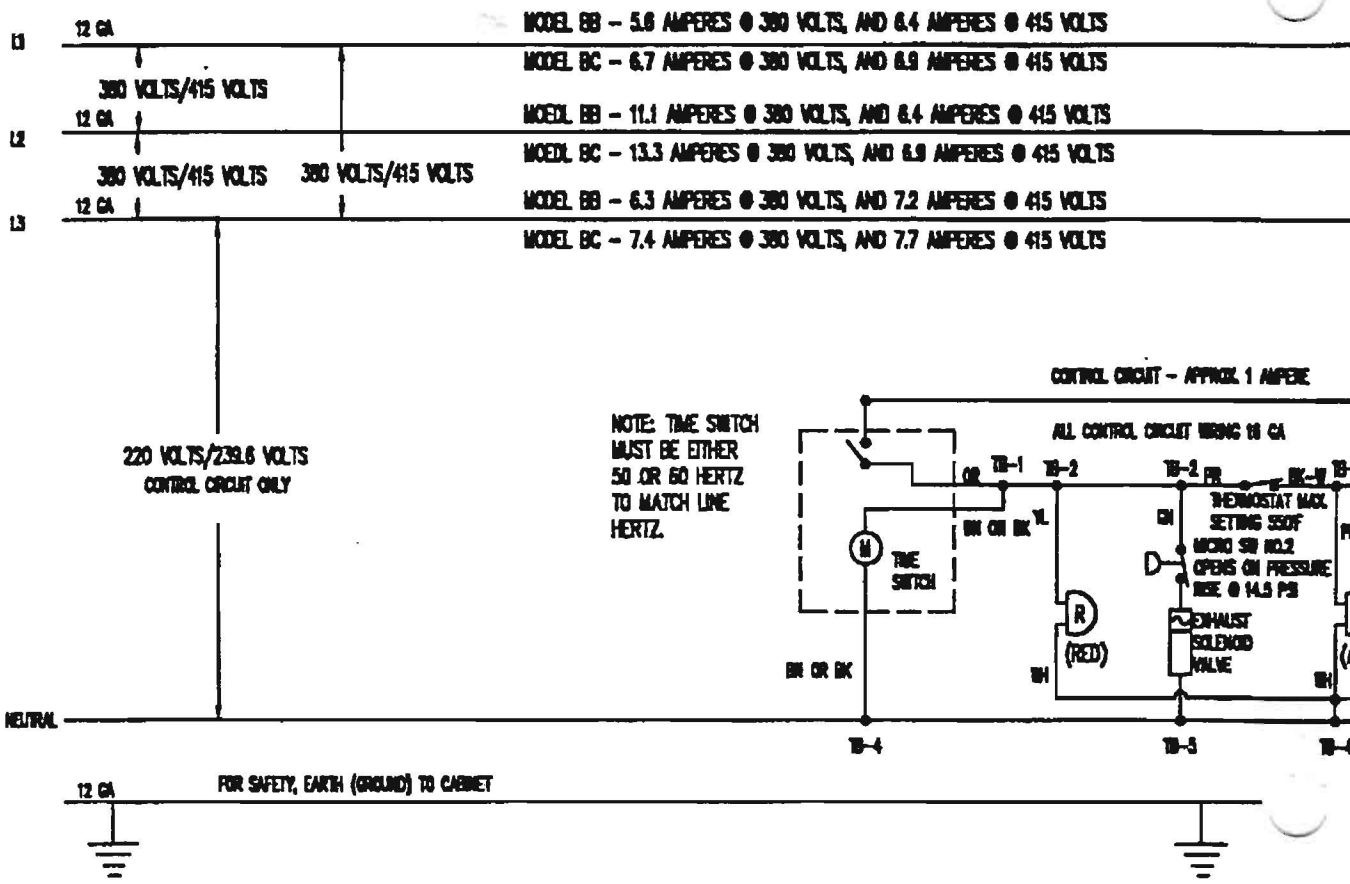
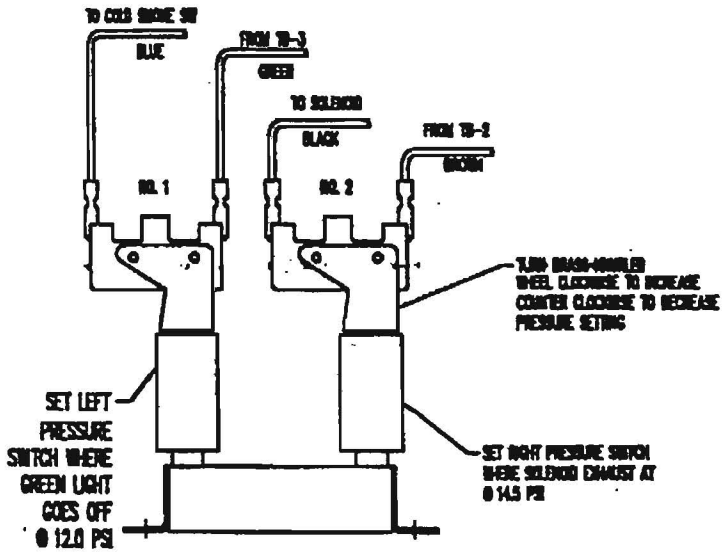
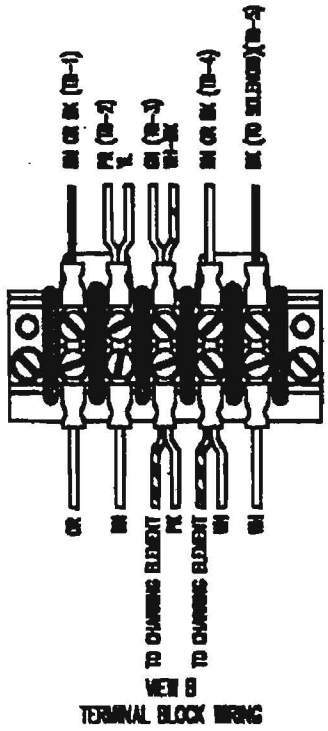
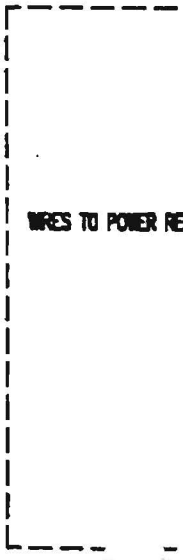

L1
12 GA
L2
12 GA
L3
12 GA
380 VOLTS/415 VOLTS
380 VOLTS/415 VOLTS
380 VOLTS/415 VOLTS
MODEL BB – 5.8 AMPERES @ 380 VOLTS, AND 6.4 AMPERES @ 415 VOLTS
MODEL BC – 6.7 AMPERES @ 380 VOLTS, AND 6.9 AMPERES @ 415 VOLTS
MODEL BB – 11.1 AMPERES @ 380 VOLTS, AND 6.4 AMPERES @ 415 VOLTS
MODEL BC – 13.3 AMPERES @ 380 VOLTS, AND 6.9 AMPERES @ 415 VOLTS
MODEL BB – 6.3 AMPERES @ 380 VOLTS, AND 7.2 AMPERES @ 415 VOLTS
MODEL BC – 7.4 AMPERES @ 380 VOLTS, AND 7.7 AMPERES @ 415 VOLTS
220 VOLTS/239.6 VOLTS
CONTROL CIRCUIT ONLY
NOTE: TIME SWITCH MUST BE EITHER 50 OR 60 HERTZ TO MATCH LINE HERTZ.
CONTROL CIRCUIT – APPROX 1 AMPERE
ALL CONTROL CIRCUIT WIRING 18 GA
TB-1
TB-2
TB-2
THERMOSTAT MAX. SETTING 550F
MICRO SW NO.2 OPENS ON PRESSURE RISE @ 14.5 PSI
TIME SWITCH
EXHAUST SOLENOID VALVE
R
(RED)
BK OR BK
BK OR BK
TB-4
TB-5
NEUTRAL
12 GA
FOR SAFETY, EARTH (GROUND) TO CABINET


TO COIL SHOWN SW
BLUE
FROM TB-3
GREEN
TO SOLENOID
BLACK
FROM TB-2
BROWN
NO. 1
NO. 2
TURN BRASS KNURLED WHEEL CLOCKWISE TO INCREASE COUNTER CLOCKWISE TO DECREASE PRESSURE SETTING
SET LEFT PRESSURE SWITCH WHERE GREEN LIGHT GOES OFF @ 12.0 PSI
SET RIGHT PRESSURE SWITCH WHERE SOLENOID EXHAUST AT @ 14.5 PSI

VIEW A
PRESSURE SWITCH SETTINGS



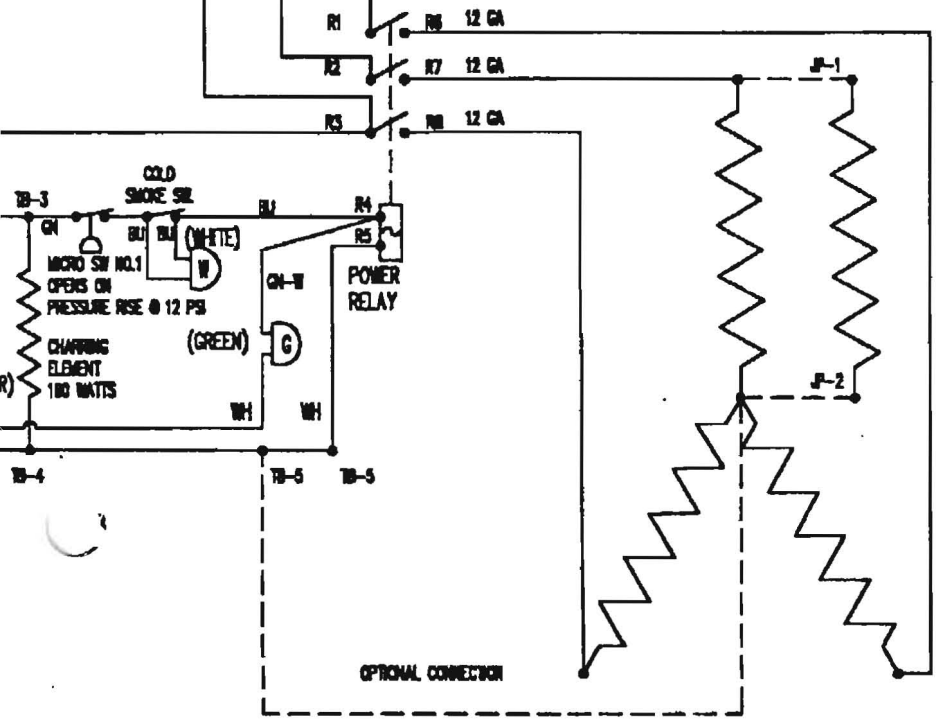
VIEW B
TERMINAL BLOCK WIRING



Smokaroma

LADDER SCHEMATIC WIRING DIAGRAM
MODELS BB AND BC

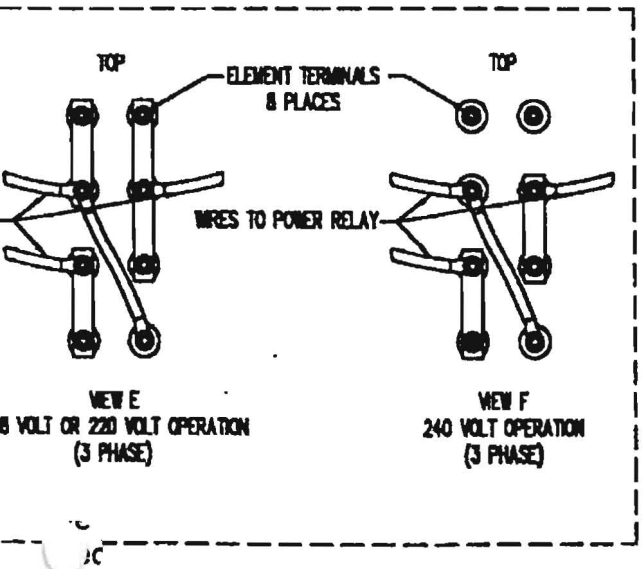
THE WIRING DIAGRAM BELOW IS WIRED FOR HIGH VOLTAGE, THREE PHASE (WYE)
SEE VIEWS E AND F BELOW FOR CONNECTIONS TO CHANGE TO A LOW VOLTAGE THREE PHASE (DELTA)



MODEL BB
1540 WATTS EA
FOR TOTAL OF
4620 WATTS
@240 VOLTS AC
& 4027 WATTS
@208 VOLTS AC
& 5776 WATTS
@220 VOLTS AC

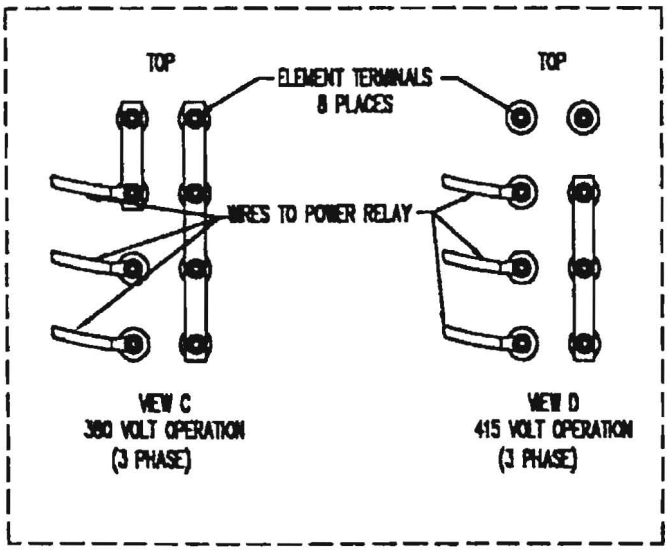
MODEL BC
1650 WATTS EA
FOR TOTAL OF
4950 WATTS
@240 VOLTS AC
& 4857 WATTS
@208 VOLTS AC
& 5548 WATTS
@220 VOLTS AC

NOTE: FOR 385 VOLT OPERATION ATTACH EXTRA
1540 WATT ELEMENT BY INSTALLING JUMPERS
JP-1 AND JP-2 AS SHOWN ABOVE
FOR 415 VOLT OPERATION CUT AND REMOVE JUMPER FROM
JP-1 AND JP-2
SEE VIEWS C & D BELOW



VIEW E
6 VOLT OR 220 VOLT OPERATION
(3 PHASE)

VIEW F
240 VOLT OPERATION
(3 PHASE)



VIEW C
380 VOLT OPERATION
(3 PHASE)

VIEW D
415 VOLT OPERATION
(3 PHASE)

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